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Original articles analysing issues and problems relevant to the region from the above perspective are welcomed for publication in the *Journal*. The articles should have a strong emphasis on the policy implications flowing from the analysis. Analytical book reviews will also be considered for publication.

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Explanatory notes

References to dollars ($) are to United States dollars, unless otherwise stated.
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A solidus (/) between dates (e.g. 1980/81) indicates a financial year, a crop year or an academic year.
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Two dots (..) indicate that data are not available or are not separately reported.
An em-dash (—) indicates that the amount is nil or negligible.
A hyphen (-) indicates that the item is not applicable.
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PRODUCTIVITY IN CHINA: PAST SUCCESS AND FUTURE CHALLENGES

*Yanqun Zhang**

The present paper discusses total factor productivity (TFP) in China, including its past success, the current slowdown, and the potential for future growth. It begins by documenting the development of TFP growth over the past three and a half decades, its driving forces and its contribution to the economic growth of the country. It then analyses the reasons for the current slowdown of TFP and economic growth, addresses the institutional imperfections that hinder growth, and explains the government policies and strategies aimed at fostering TFP. Next, it explores the potential for TFP growth from the perspective of institutional reform, investment in research and development and human capital. The paper concludes that although the resources of the past successful TFP have decreased or diminished, further institutional reform, increasing investment in research and development and human capital, and strategies promoting indigenous innovation will become new engines for future TFP growth in China. As the country's TFP is still at a low level compared with advanced economies, there is large scope for China to maintain relatively high TFP growth, although uncertainty and risk are associated with this process.

JEL classification: E17, C22.

Keywords: China's total factor productivity (TFP), institutional reform, indigenous innovation, new normal, strategies for fostering TFP, potential TFP growth.

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I. INTRODUCTION

During the past three and a half decades, China has achieved unprecedented economic growth, with an average annual gross domestic product (GDP) growth rate of 9.3 per cent over the period 1978-2014. At that rate, real GDP doubles every seven years. The real per capita GDP of China rose from only 5.5 per cent of the level of the United States of America to about 25 per cent in 2014. In 2014 the per capita GDP reached about $7,584 (current price), or $12,608 international dollars (2011-year purchasing power parity (PPP) constant price, World Development Indicators), which is about 31 per cent of the level of high-income OECD countries. As a result, China has transformed from being one of the poorest agricultural countries in the late 1970s to the second largest economy in the world, accounting for 16.6 per cent of global GDP in 2014 (PPP current price, World Bank Indicators). China and other emerging markets now represent the majority of the growth of global demand, and have become major engines for economic growth.

However, economic growth in China has shown a declining trend since the global financial crisis in 2008, especially after 2011 (figure 1), and is still subject to downward pressure, which is likely to continue in the next couple of years, according to projections made by the International Monetary Fund (IMF) and other forecasts.

Figure 1. The growth rate of real gross domestic product, 1990-2015

Source: WIND Database.

GDP growth decreased to 7.3 per cent in 2014, and 6.9 per cent in the first three quarters of 2015, which is lower than the average for the last three decades, and the lowest level since 2000. The Government of China has stated that the economy has entered a state of "new normal", meaning that the gear of growth has shifted down from high to medium-to-high speed.

The growth deceleration is caused by both cyclical and secular factors. In response to the global financial crisis in 2008, China launched a very large stimulus package to promote growth through extensive investments, which led to a significant increase in bank loans and fixed asset investment in 2009 and 2010 (Wong, 2011). As bank loans have mainly flowed into State-owned enterprises or the real estate sector, the distortion of capital allocation and the overcapacity problem already existing in most industrial sectors have deteriorated. Domestic and international demand have slowed, resulting in a significant increase in companies' debt leverage rate and loans held by banks, which has led to a decline in fixed asset investment growth, from 33.2 per cent in 2009 to 14.7 per cent in 2014 (WIND Database). This has been the main factor in the short run behind the slowdown in GDP growth in recent years. Meanwhile, the sluggish world economy and international trade have also exerted significant negative impacts on the country's exports and economic growth in the short run.

The debate on whether rapid growth in China is sustainable has been ongoing for several years. One major argument for the non-sustainability of that high growth is built on the belief that it is driven by extensive investment; hence, it has been achieved through heavy dependence on capital-deepening and exports and not through increased productivity. This is indicated by the large share of capital formation in GDP, which increased significantly after the financial crisis in 2008 and the subsequent stimulus policy.

Another argument is related to the so-called middle-income trap. International experience suggests that, when a country's per capita GDP reaches the threshold of about $15,000, or $11,000 in year 2005 PPP dollars, high growth begins to slow (Chen, Jefferson and Zhang, 2011; Eichengreen, Park and Shin, 2014). If the economy reaches such a middle-level income and stays at that level, it is said to have fallen into the middle-income trap. As the per capita GDP of China is already very close to the first threshold (about $11,000 PPP constant price in 2005, World Bank Indicators), the question of whether the Chinese economy can avoid the middle-income trap and advance to becoming a high-income economy has become a hot topic in academic discourse and policy discussions.

The driving forces for rapid economic growth in China over the last three decades can be attributed to the demographic dividend, resource reallocation from low to high efficient sectors, and the increase in labour productivity, which can be decomposed as TFP and the capital/output ratio (Aoki, 2015). The ratio of the population aged 15 to 65 years to total population began to decrease in 2010 after rising steadily in the preceding years, which means that the demographic dividend is also declining. With the diminishing demographic dividend, capital returns will reduce and the contribution from the improved capital/output ratio will decrease. Thus, TFP growth will play a crucial role in economic growth (Aoki, 2015; Cai, 2013). Empirical evidence shows that TFP growth has made important contributions to the spectacular growth of the country over the past three decades (Perkins and Rawski, 2008; Brandt and Zhu, 2010; Zhu, 2012; Feenstra, Inklaar and Timmer, 2015). According to the Penn World Table 8.1 (Feenstra, Inklaar and Timmer, 2015), over the period 1978-2011 China enjoyed an average growth rate of TFP of about 3.5 per cent per year, accounting for about 40 per cent of GDP growth. Studies using aggregate data combining TFP information from both agricultural and non-agricultural sectors typically find that TFP growth contributes approximately half of a country's labour productivity growth (Perkins and Rawski, 2008).

As rapid gains in productivity have contributed a large proportion to economic growth, China needs to focus on how to promote further productivity growth, as it strives to achieve middle-to-high speed growth and attain growth targets in the future.

According to the proposal of the thirteenth five-year plan (2016-2020), China will reach the status of a moderately prosperous society by 2020, when the per capita income will be double of that in 2010. To achieve this target, the Government of China has set economic growth as the priority, and is determined to transform the nature of that growth from relying on investment and exports to being driven more by domestic demand and innovation. A series of policies and measures have been adopted to foster the institutional reform and indigenous innovation, which will bring new engines for economic and TFP growth. However, at the same time, uncertainty and risk can be associated with this process.

In the present paper, TFP of China, its development and role in economic growth, and the sources behind it during the past three and a half decades are discussed. The prospects for the country's potential growth are also examined. More specifically, the author of the paper:

- Analyse the contribution of and driving forces behind the rapid TFP growth in the past few decades;
- Explain the reasons for the current slowdown of TFP and economic growth;

- Discuss the current institutional imperfections hindering TFP growth;
- Introduce the policies and strategies adopted by the Government to foster TFP growth;
- Discuss the challenges and uncertainty for the policy implementation;
- Analyse the potential for future TFP growth and its new engines.

The remainder of the paper is arranged as follows. Section II reviews the development of TFP growth in China, and its contribution to the economic growth in recent decades. Section III analyses the driving forces behind the high TFP growth. Section IV discusses the institutional imperfections and potential new engines for future TFP growth. Section V introduces the policies and strategies adopted by the Government of China to promote TFP growth. Section VI discusses the prospects for TFP growth in the future. Section VII contains a summary of the paper.

II. THE HIGH TOTAL FACTOR PRODUCTIVITY GROWTH IN RECENT DECADES

Estimation of the total factor productivity growth

Estimation of productivity growth in China has been a hot topic in both theoretical and empirical research. Most investigations find that during the last three decades, the country's average TFP growth has been about 3 to 4 per cent per year, and has contributed significantly to GDP growth (Young, 2003; Perkins and Rawski, 2008; Zheng, Bigsten and Hu, 2009; Brandt and Zhu, 2010; Zhu, 2012; Feenstra, Inklaar and Timmer, 2015). Brandt and Zhu (2010) and Zhu (2012) conducted a standard growth accounting exercise that decomposes the sources of growth into capital deepening, labour deepening and productivity growth. They conclude that the average growth of TFP during the period 1978-2007 was 3.2 per cent, which is similar to estimate given in other researches, and that TFP growth contributed about 77.7 per cent of the per capita GDP growth (Zhu, 2012). In contrast, the capital-to-output ratio, namely capital deepening, contributed only 0.51 per cent. In fact, during this period, the capital-to-output ratio barely increased. This finding provides evidence that the main factor behind the country's rapid economic growth is TFP growth, not investment.

Using the same method as Zhu (2012) but extending the sample to 2011, Liu (2015) finds that the growth of TFP significantly decreased after 2008, while the share of capital deepening to growth of GDP increased. The estimation based on the Penn World Table 8.1 (Feenstra, Inklaar and Timmer, 2015) yields similar results.

Total factor productivity growth in agriculture, State, non-State owned and service sectors

The TFP performance of China varies across individual sectors and during different periods. For the period 1978-2007, the average annual growth rates of TFP in the agricultural and non-agricultural non-State sectors were 4.01 and 3.91 per cent, respectively (Zhu, 2012). In contrast, the annual TFP growth in the State-controlled sector was only 1.68 per cent. The non-agricultural State-owned sectors experienced the lowest TFP growth, especially before reform of State-owned enterprises started in 1993. During the first two decades of reform during the periods 1978-1988 and 1988-1998, the TFP growth for the non-agricultural State-controlled sectors was only -0.36 and 0.27 per cent a year, respectively. However, during the period 1998-2007, it increased to 5.50 per cent a year (Zhu, 2012).

Because of a lack of sufficient competition in the non-tradable service sectors, particularly in those areas in which large State-owned firms dominate the market, productivity growth has been notably lower than that in the tradable sectors (Holz, 2006; He and others, 2014). According to the estimation of He and others (2014), TFP growth of the tradable sector was 4.9 per cent for the period 2001-2010, 5.7 per cent for 2001-2005, and 4.2 per cent for 2006-2010, but that of the non-tradable sectors for the corresponding periods was 2.4 per cent, 3.3 per cent and 1.4 per cent, respectively. Within the non-tradable sectors, great intrasector heterogeneity exists (Holz, 2006; He and others, 2014). Holz (2006) finds that education had the highest TFP growth during the period 1979-2002, while financial services had the lowest. In addition, productivity growth differentials between the tradable and non-tradable sectors in China have been much higher than those in developed economies (He and others, 2014). The lower productivity growth in the non-tradable sectors can be largely attributed to overregulation, barriers to entry and low levels of competition. Some service sectors, such as education, health care, banking, insurance, legal services and telecommunications, are still dominated by the State-controlled enterprises. These enterprises are subject to overregulation, which not only deters entry by overseas investors, but it also restricts competition among domestic participants. The strict regulation on entry into the service market has lowered competition pressure and contributed to low productivity growth. Opening up the service sector to private and foreign investors is crucial to foster productivity in the future.

III. DRIVING FORCES OF GROWTH IN TOTAL FACTOR PRODUCTIVITY IN RECENT DECADES

Reallocation of resources

The reallocation of resources has played an important role in the rapid growth of TFP. The reallocation is seen predominantly in two directions: from the agricultural sector to the non-agricultural sector, and from the State-owned sector to the non-State owned sector.

During the first two decades, after the start of the country's economic reforms in 1978, TFP growth in agriculture increased rapidly, driven largely by institutional reforms and technological progress. The reallocation of labour from the agricultural sector to the non-agricultural sector facilitated TFP growth of the whole economy.

Before the agricultural reform began, the agricultural sector was characterized by a "collective farming system", under which farmers' incomes were not related to their efforts; hence there was no incentive to work hard. As a result, productivity in the agricultural sector was very low, and China experienced recurring food crises. In 1979, the "household responsibility system" was adopted. Under this system, farmers were responsible for their own output, and their incomes were directly dependent on their efforts. Meanwhile, the government gradually increased official prices for grain. Farmers were allowed to sell grain at market prices, only after they had sold a fixed quota to the government at official prices. These institutional and price reforms generated strong incentives for farmers to work harder, and consequently, resulted in a significant increase in agricultural output and farmers' incomes.

Starting in about 1990, the agricultural markets were gradually liberalized. Farmers were able to make their own decisions on their input choices with less intervention from the Government and fewer restrictions. The liberalization of the agricultural markets fostered the adoption of new technologies by farmers, such that, after 1990, most of the growth in agriculture's TFP came from technological progress (Jin and others, 2010).

According to the estimation of Zhu (2012), TFP growth in the agricultural sector during the periods 1978-1997 and 1998-2007 was 5.1 and 3.1 per cent, respectively. The rapid TFP growth not only led to a substantial increase in grain production, which after several years of reform was sufficient to solve the food deficit problem, but also made it possible to reallocate employment from the agricultural to the non-agricultural sector. As labour productivity in the non-agricultural sector is more than five times higher than that in agriculture, this reallocation of workers has been the most important source of aggregate productivity growth.

Before they were reformed, State-owned enterprises dominated all industries. The prices of raw materials and products of those enterprises were determined by the government's plan rather than by the market. The Government kept the profits and were responsible for the losses.

The State-owned enterprise reform began with the introduction of the dual-track price system (Zhu, 2012). Under this system, State-owned enterprises must sell a quota of products at official prices, and then could sell products beyond that quota at market prices, which were usually higher than the official ones. Moreover, those enterprises were allowed to keep part of their profits. The quotas were gradually reduced and eventually eliminated. By the mid-1990s, most products were being sold at market prices. This price system reform not only generated strong incentives for State-owned enterprises to increase productivity, but it also enabled them to access goods and capital from the markets.

Before the second round of State-owned enterprise reform started in 1997, the Government would often asked State-owned banks to bail out loss-making State-owned enterprises to avoid laying off workers or shutting down factories, in order to maintain social and political stability. After 1997, the loss-making State-owned enterprises were allowed to be restructured through bankruptcy or privatization through management buyouts (Zhu, 2012). The previous restrictions preventing the entry of non-State owned firms were gradually eliminated, thus introducing competition, with a consequent improvement in productivity.

As non-State enterprises continue to outperform the State-owned sector, the reallocation of labour and capital from the State to the non-State sector has contributed a large proportion to the growth of TFP, especially before the start of the reform of the State-owned enterprises in 1993. According to the estimation of Brandt and Zhu (2010), from 1988 to 1998, the average annual growth rate of TFP in the State sector was only 0.27 per cent, while the comparable growth rate in the non-State sector was 2.17 per cent. From 1998 to 2005, a more efficient allocation of capital and labour, mainly from State-owned to non-state firms, contributed about two percentage points per year to the aggregate TFP (Jefferson, Rawski and Zhang, 2008; Hsieh and Klenow, 2009).

Since the beginning of the millennium, when the Government of China launched reforms by merging, privatizing and restructuring the remaining State-owned enterprises, the productivity of such enterprises has significantly improved. According to the estimation of Zhu (2012), the TFP growth of State-owned enterprises in non-agricultural sectors increased from 0.27 per cent during period 1988-1998 to 5.5 per cent during the he period 1998-2007.

Institutional reforms of trade, investment and migration

According to the estimation of Tombe and Zhu (2015), reductions in transaction and migration costs were among the main factors supporting aggregate labour productivity growth in China from 2000 to 2005. As the trade cost in China is still high, for example, 40 per cent higher than that in Canada, there is still large scope for further reductions in costs associated with trade and migration, and for promoting increased productivity.

In order to enter the World Trade Organization (WTO) in 2001, the Government of China cut tariffs, broadened trade rights and liberalized its regime for foreign direct investment (Branstetter and Lardy, 2008). Between 1998 and 2007, the share of total urban employment in domestic private enterprises and foreign-invested enterprises increased from 8 to 24 per cent. As foreign-invested enterprises in general have higher than average productivity (Hsieh and Klenow, 2009; Song, Storesletten and Zilibotti, 2011), the policy of opening up the economy and trade liberalization has played an important role in boosting productivity.

Domestic trade reform has led to a reduction in internal trade and migration costs, which, in turn, has resulted in a reduction in the misallocation of labour and the promotion of TFP growth. Local protectionism had been one of the factors contributing to the high domestic trade cost. Local governments had strong incentives to protect their tax base and local State-owned enterprises by preventing interregional competition (Bai and others, 2004). This continued unchecked in the early years of economic reform until 2001, when the Government issued a directive to prohibit local government from engaging in efforts to protect the local markets. Before China entered WTO, some industries in the domestic trade sectors, such as transportation and logistics, were dominated by the State-owned enterprises, and barriers to entry for non-State sectors, especially foreign investors, were prevalent. After its entry into WTO, the barriers were gradually removed and non-State enterprises began to enter the domestic trade sectors, which led to a significant reduction in costs and improved productivity.

To summarize, the sources of TFP growth can mostly be attributed to the institutional reforms that allowed labour and capital to be reallocated from low- to high-efficient sectors, such as from agricultural and the State sectors to the non-agricultural and non-State sectors. Liberalization of domestic and external trade, resulting from economic reforms and the opening-up strategy, reduced trade and migration costs and has been another significant source of the rapid TFP growth. Similar to other developing countries, China has benefited from the catch-up advantage by importing advanced technology from industrialized countries, rather than having to pioneer new technologies.

IV. NEW ENGINES FOR TOTAL FACTOR PRODUCTIVITY GROWTH

Economic structural changes and total factor productivity growth

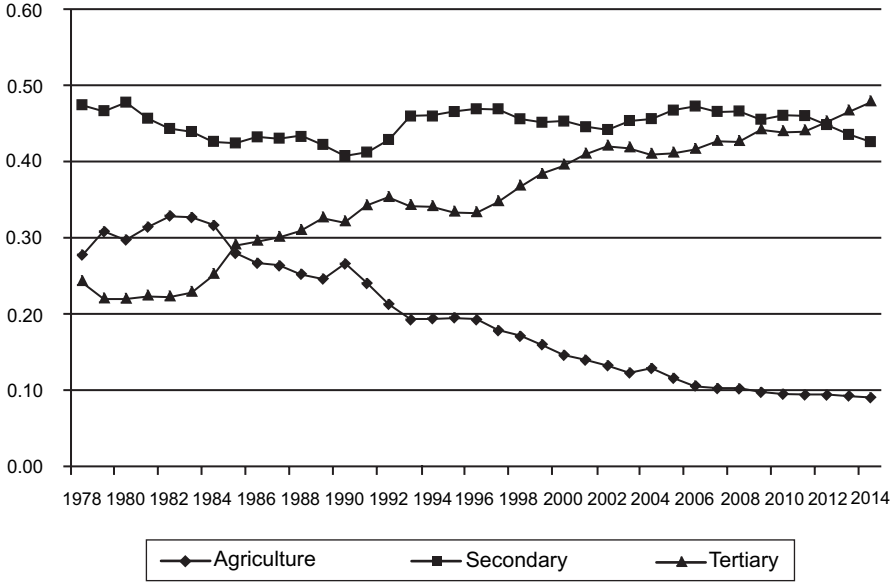
During the period of rapid economic growth, the economic structure of China underwent fundamental changes. Some of the factors that had driven the growth of TFP during the past few decades are less or no longer significant to the overall growth process.

First, in 2012, the output share of the service sector in GDP grew from 32.4 per cent to 48.1 per cent and surpassed that of secondary industry. For a long period, the development of the country's service sector had lagged far behind, and its GDP share had been less than that of secondary industry. Internationally, it was much smaller than not only the average share of industrial countries, but also the world average. Therefore, the increase in the GDP share of the service sector can be regarded as a positive sign of the structural improvement fostered by government policies. With the increase in household's income, the country's consumption pattern is transforming from the consumption of more physical products to using more services. As reallocating resources from a productive export-oriented industry to a highly unproductive services industry could cause a permanent decline in the economy's productivity (Lee and McKibbin, 2014), the structural change will exert downward pressure on TFP growth.

Second, output of and employment within the agricultural and State-owned sectors have decreased steadily. From 1990 to 2014, the share of agricultural output in GDP declined from 26.7 per cent to 9.2 per cent, although it has remained constant in recent years (figure 2). Since the early 1990s, when the reform of State-owned firms was launched, the share of the State sector in urban employment has steadily declined, from 61 per cent in 1990 to 16 per cent in 2014. The employment share of the agricultural sector declined from 70.5 per cent in 1990 to 29.5 per cent in 2014 (figure 3). Employment shares of secondary and tertiary industries, however, are on the rise. In 1995 the employment share of the tertiary sector surpassed that of secondary industry. In 2014 the employment shares of secondary and tertiary industries were 29.9 per cent and 40.6 per cent, respectively.

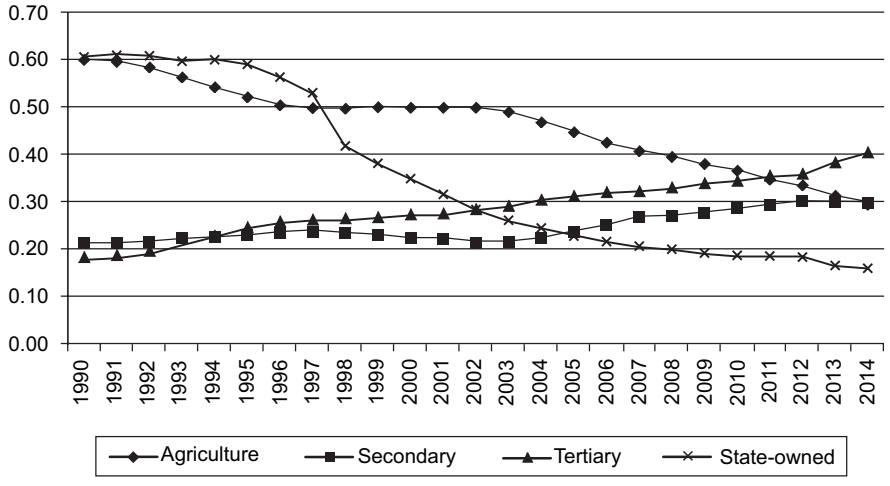
Figure 4 shows the relative labour productivity of agricultural and tertiary industries to that of secondary industry (calculated as labour productivity of agricultural/tertiary divided by that of the secondary sector). The outcome indicates that labour productivity of the agricultural sector is much lower than that of secondary and tertiary industries. Before 2000 the ratios increased significantly, but afterward, they become more or less constant. This may be because, prior to 2000, labour

Figure 2. Output shares of agricultural, secondary and tertiary sectors in gross domestic product



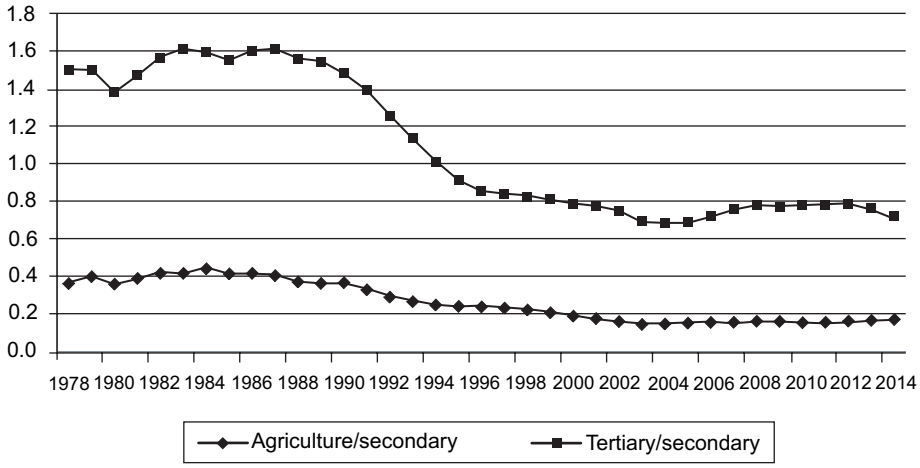
Source: WIND Database.

Figure 3. Employment shares of agricultural, secondary, tertiary and State-owned sectors



Source: WIND Database.

Figure 4. Ratio of labour productivity: agricultural/secondary and tertiary/secondary sectors



Source: WIND Database.

productivity in the industrial sector was growing more rapidly than in the agricultural and tertiary sectors whereas since 2000 growth has been at almost the same pace.

As the GDP shares of output and employment in the agriculture and State sectors have declined, labour and capital reallocation from those sectors, which has been one of the main driving forces of TFP in the last three decades, will become smaller.

Third, as China approaches the technological frontiers, the catch-up advantage will be smaller and its TFP and economic growth will be more dependent on indigenous innovations.

Given that the reallocation from the agriculture and State sectors has slowed or even dried up in recent years, and the technological gap between China and industrial countries in terms of advanced and cutting-edge technology has narrowed, additional driving forces for productivity growth must be identified and promoted.

Institutional reform and new engines

Although some of the factors that supported TFP growth in the last few decades have decreased or diminished, there is still scope to foster the growth of TFP by means of further institutional reform and liberalization efforts.

For example, the current household residential registration or *hukou* system serves as an obstacle to labour mobility and reallocation, and needs to be reformed. Even though more than 50 per cent of the population live in cities, only about 40 per cent of them have *hukou* status for the cities in which they live. Lack of *hukou* status means the migrants cannot get access to some public services, such as children's education, health care and social security, and are usually in an unfavourable position when applying for jobs or involved in wage bargaining. This has impeded labour mobility and increased the costs of labour reallocation. Further reform of the *hukou* system aimed at granting migrants better access to public services is expected to promote labour reallocation and aggregate productivity.

The weak performance of State firms remains another significant obstacle to economic growth. Despite the extensive effort to reform State-owned enterprises, which began in 1998, some sectors, such as energy, transportation, telecommunications and the banking, are still monopolized by State firms. In addition, State-owned enterprises remain active in a wide range of non-strategic sectors, ranging from textiles and papermaking to catering (Du, Liu and Zhou, 2014). Over the past 10 years, reforms of State-owned enterprises have stagnated and, under weak corporate governance, they are increasingly inefficient and unprofitable, with generally lower productivity than non-State firms. Further reform of State-owned enterprises will improve productivity.

The service sector, especially the financial sector, is still protected by barriers to prevent the entry of private or foreign firms. The banking sector is largely State-controlled, and bank loans disproportionately favour State-owned enterprises at the expense of more productive private firms (Liu, 2015). Song, Storesletten and Zilibotti (2011) find evidence that financial imperfection is a big obstacle to reforming State-owned enterprises and TFP growth. Because banks are State-dominated and tend to be supportive of the State-owned enterprises, private small and medium-sized enterprises, which are often more productive than the ones that are State owned, have a more difficult time accessing banking credit; State-owned enterprises with low productivity can survive by means of preferential access to cheap credit. This distortion in the credit allocation stifles competition and innovation from the private sector (both domestic and foreign) and encourages inefficient allocation of resources, overinvestment, and overcapacity in industrial production (Chen, Jefferson and Zhang, 2011; Song, Storesletten and Zilibotti, 2011).

In addition, overregulation and barriers to entry are the main obstacles impeding TFP growth in the service sector. If the restrictions were to be lifted and discrimination removed, this would open up a great opportunity to foster productivity in that sector.

While these potential efficiency gains are substantial, in order for them to be realized, many obstacles must first be eliminated.

V. POLICIES AND STRATEGIES TO FOSTER THE TOTAL FACTOR PRODUCTIVITY GROWTH

Government policies and strategies

The Government of China has stated its target for economic growth by 2020 is to double the per capita GDP as compared with the 2010 figure. To reach this target, the average annual growth rate per year during the period 2016-2020 must be at least 6.7 per cent. Given that the country's economic growth is currently trending lower, it will be difficult for the Government to keep economic growth at such a relatively high rate. Therefore, measures need to be taken to foster productivity and economic growth.

As capital returns are decreasing because of the ageing demographic structure and the diminishing demographic dividend (Cai, 2013), increased productivity will be more significant factor behind the economic growth in China, especially in terms of indigenous innovations. According to the official blueprint of the thirteenth Five Year Plan (2016-2020), issued in November 2015, the Government has pledged to take measures to promote better allocation of resources, including labour, capital, land and technology, and to transform the development pattern from being based on extensive investment to one that is more innovation-driven. Further reform of State-owned enterprises, the *hukou* system and fiscal and financial systems, as well as the liberalization of the service sector, boosting innovations, research and the Internet, are at the centre of the agenda.

To facilitate labour mobility and reallocation, the Government is determined to increase the urbanization ratio calculated based on the number of registered residents. It will do this through reform of the *hukou* system, which entails granting migrants greater access to public services in the cities where they work.

Another strategy to be implemented, "Internet Plus", is intended to encourage traditional industries to better integrate and upgrade their Internet capabilities. The Government has stated its intention to enhance investment in Internet infrastructure throughout the country.

The Government has also adopted measures to encourage people to start their own businesses and to be innovative. Some outdated regulations and restrictions, which prevent people from starting businesses, have been abolished. In addition,

people who start their own business are being supported by a series of favourable policies, such as preferential taxation, simplified approval procedures and easier access to financial support. To engage in pioneering work and make innovations are becoming popular ideas in China, in the society as a whole.

Measures have also been taken to encourage foreign direct investment. To support this effort, the Government is issuing a nationwide "negative list", which clearly indicates sectors and businesses that deny access to foreign investment. This is intended to ensure the protection of foreign investors' rights and better allocation of their funding. Meanwhile, China continues to promote the Belt and Road Initiative by enhancing cooperation with countries and regions along the route. In addition, some service industries, such as health care, education and telecommunications, which had been closed to foreign direct investment for many years, is being opened up in an orderly way.

Financial system reform will be the focal point over the next five years. The direction of the reforms is to establish a transparent, multitiered and sound functioning capital market. A multilevel and diverse banking system will be encouraged by allowing more private investment in the banking system. The Government is pushing forward a market-oriented exchange rate and interest rate formation mechanism, along with the internationalization of the Chinese renminbi. Other plans include the building of an inclusive financial system to give ordinary citizens access to financial services.

Challenges and uncertainties around the policy implementation

To carry out the planned reforms, and to achieve economic growth, China is faced with extensive challenges and uncertainty.

First, the Government needs to balance the trade-off between short-run growth and structural transformation. Reform and structural transformation may cause economic growth to slow in the short run, and hence could be in conflict with the growth objective for the next five years. Given the current declining trend of economic growth, it may be difficult for the government to reach the growth target of doubling per capita income by 2020, while at the same time promoting structural transformation and institutional reform.

Second, the road map for this round of State-owned enterprise reform is still under discussion and remains unclear. "Mixed ownership" and "capital supervision" are the two key terms for this round of reform, which is intended to encourage private investors to take a controlling interest in State-owned enterprises, and allow employees to hold shares. By introducing mixed-ownership, the Government intends

to improve the governance structure of State-owned enterprises and better supervise the State assets.

There are many challenges in this process. For example, the central Government and local authorities could very well have different attitudes towards State-owned enterprise reforms. Under the current condition of deterioration of the local fiscal condition, the local authorities are particularly enthusiastic about the reforms, to rid themselves of liabilities caused by local State-owned enterprises that have experienced declining profits or losses. However, the central Government is more concerned with State-owned enterprises' social responsibility and the loss of State assets. The central Government's target for State-owned enterprises is to make State assets more vital and influential so as to play a more significant role in the reconstruction and upgrading of the economy, as well as in fulfilling firms' social responsibility. The inconsistent attitudes of local and central Government may lead to uncertainty and sluggishness in the State-owned enterprise reform.

Third, reform of the *hukou* system would lead to an increase in fiscal expenditure on the part of local authorities, which are entrusted with financing local public services, such as education and health care. Under current circumstances, this may be difficult. During the last decade, revenue from land sales has played an important role in local authorities' fiscal revenue. Given that, more recently, the revenue from land-related assets has decreased significantly as investment in real estate has slowed, reform of the *hukou* system will be a great challenge for the local authorities. Further reform of fiscal revenue reallocation between the central and local government is necessary.

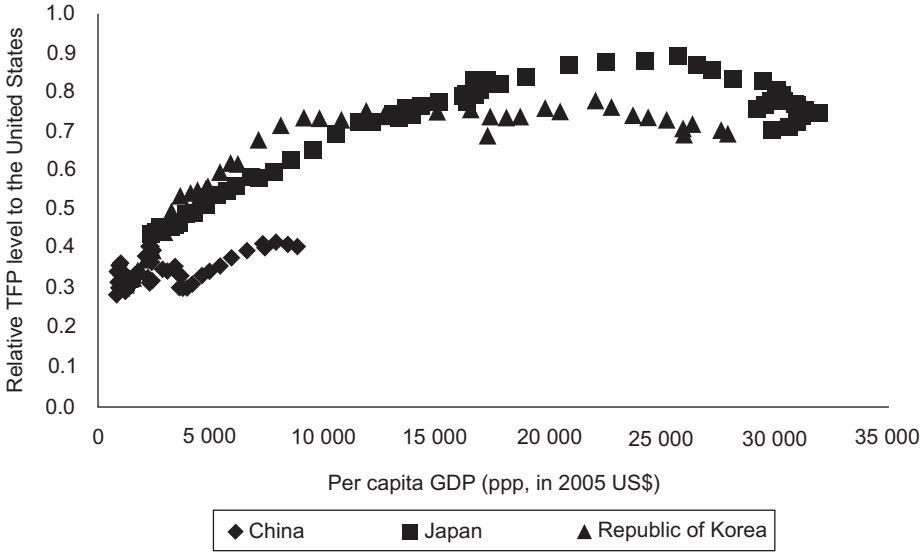
VI. PROSPECTS FOR FUTURE GROWTH OF TOTAL FACTOR PRODUCTIVITY IN CHINA

Productivity in China remains at a relatively low level

In spite of the rapid TFP and economic growth during the last three and a half decades, because of the low starting point, the TFP and development level of China are, in general, still far behind those of the frontier and developed economies. Consequently, there is great scope for China to take advantage of catch-up effects.

Figure 5 shows the development of productivity and economic growth relative to the United States of America, Japan and the Republic of Korea. At the stage of catch-up, both Japan and the Republic of Korea experienced rapid TFP growth, which narrowed the gap between them and the United States. When TFP of Japan relative to the United States reached 83 per cent in 1975, and that of the Republic of Korea

Figure 5. The correlation between per capita gross domestic product and the total factor productivity level relative to the United States: China, the Republic of Korea and Japan



Source: Penn World Table 8.1 (Feenstra, Inklaar and Timmer, 2015).

reached 63 per cent in 1990, these economies began to experience slower growth of relative TFP and economic growth. According to Penn World Table 8.1 (Feenstra, Inklaar and Timmer, 2015), the ratios of per capita GDP and TFP of China relative to the United States increased from 5.5 and 30 per cent in 1978 to 20.7 and 40 per cent in 2011, respectively. If China mimics the experience of Japan or the Republic of Korea, its TFP will be at least 60 per cent of that of the United States before TFP growth declines significantly. Therefore, China still has large room to improve TFP by taking advantage of catch-up before relative productivity and economic growth starts to slow.

Development of research and development and human capital

It is generally believed that technological innovation and human capital are the two key factors for TFP growth. Therefore, in this study, the prospects for future TFP growth through analysing the investment in research and development and human capital are formulated.

In early 2006, the Government of China promulgated the outline of National Medium- and Long-term Program for Science and Technology (2006-2020), in which one of the key indicators is that the gross expenditure on research and development will exceed 2.5 per cent of GDP, with the contribution rate of science and technology progress to economic development exceeding 60 per cent. In recent years, spending on research and development sourced from government and enterprises has increased. Rising labour costs and the overcapacity that is widespread in industry have forced enterprises to increase their investment in innovation and new technology. The ratio of research and development expenditure to GDP has increased steadily, to reach 2.5 per cent in 2015, which is above the EU-28 level (Boeing, Mueller and Sandner, 2016). In terms of volume of research and development, since 2013 China has held the number two position globally behind the United States, and the gap is still narrowing. Over the same period, policies have been issued aimed at strengthening the protection of intellectual property rights, with the objective to create a better institutional environment for innovation. Patent applications have surged in recent years, making China the leading country in annual patent application since 2011.

The general education level of Chinese people has increased steadily. During the period 1985-2012, the years of schooling of the national average labour force increased from 5.96 to 9.91, while for the urban counterpart, it increased from 8.14 to 10.98. The ratio of the population that has a college education to the total population increased from 10 per thousand in 2000 to 15 per thousand in 2015. During the period 1985-2012, rural human capital grew at an average annual rate of 2.91 per cent, while urban human capital grew 8.68 per cent annually (Li, 2015). The increasing urbanization rate and one-child policy have had positive effects on fostering the education level, because of the quantity-quality trade-off. Nevertheless, in spite of the significant improvement, the human capital per capita of China remains relatively small compared to that in developed countries (Li, 2015).

The Government is stressing the importance of high-level leading talents. A number of strategies have been implemented to encourage Chinese scientists and experts living and working overseas to return to China. In recent years, more and more students who have studied abroad have come back to China after graduation, with the growth rate of those returnees in the double digits. The return of students who have studied advanced technology, knowledge and ideas are expected to have a positive effect on narrowing the technology gap between China and the advanced economies.

The Government of China has announced that the economy has entered the stage of "new normal", which means that growth will depend more on indigenous innovation and TFP growth. The future of TFP growth in China will, in turn, depend on indigenous technological innovation and institutional reform, especially the reform of State-owned enterprises, in order to promote the further reallocation of labour and capital from low to high efficient sectors, which has provided a model of successful experience in promoting TFP growth during recent decades.

VII. SUMMARY

China has experienced unprecedented high TFP and economic growth in the last few decades. Institutional reform, the population dividend and the catch-up effect have played key roles. As the driving forces for the previous high TFP growth have now partially diminished or vanished, new engines are needed for future TFP and economic growth. China has entered the stage of "new normal", which indicates that the economic and TFP growth will depend more on indigenous innovation. Under these circumstances, the Government of China has formulated strategies and taken measures to foster further institutional reform and strengthen the investment in research and development and human capital. If the reform strategies can be steadily pushed forward and carried out successfully, and if the problems and risks incurred can be tackled appropriately, the ongoing institutional reform may generate new engines for relatively high TFP and economic growth.

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DO DATA SHOW DIVERGENCE? REVISITING GLOBAL INCOME INEQUALITY TRENDS

*Sudip Ranjan Basu**

The present paper shows the results of an empirical study to prove that income inequality has increased over the past decades. To conduct the study, an income inequality dataset containing 133 countries over the 1990-2014 period was created. The results indicate that globally, income inequality (population-weighted Gini coefficients), on average, increased from 38.6 to 41.8 during that period. They further show the existence of variations in the level of income inequality across regions and groups of countries. The reduction in income inequality, among others, remains one of the key challenges associated with the 2030 Agenda for Sustainable Development. Therefore, in this paper, various transmission mechanisms and drivers of the increasing level of income inequality are identified and possible forward-looking development policies to reduce income inequality are given.

JEL classification: D63, Q01, F43.

Keywords: Inequality, Gini coefficient, sustainable development, growth.

I. INTRODUCTION

Government leaders and policymakers have adopted an ambitious and transformative agenda to not only work towards the complete eradication of extreme poverty but also to reduce inequality within the context of the 2030 Agenda for

* The earlier version of the present paper, "Growing together with growth polarization and income inequality", was presented by the author at the Department of Economic and Social Affairs Expert Group Meeting on the World Economy (LINK Project), United Nations Headquarters in October 2013. Available from www.rotman.utoronto.ca/-/media/Files/Programs-and-Areas/RIIB/.../25.pdf. Thanks are due to the workshop participants, especially Peter Pauly. I would also like to extend my sincere thanks to Johannes Prochazka and Candice Branchoux for their excellent research support. I am grateful to anonymous referees for their useful and constrictive comments. The views expressed in this paper are those of the author and should not necessarily be considered as reflecting the views or carrying the endorsement of the United Nations. All errors and omissions are the author's sole responsibility.

Sustainable Development.[1] The Sustainable Development Goals are expected to transform the societal approach to the changing nature of the global distribution of income and transmit the benefits of increasing global income across the countries in order to share prosperity for all. To implement the 2030 Agenda, countries need to be prepared to provide a set of national development policies that are more inclusive and sustainable.

Over the past decade, it has become increasingly evident that the regions around the world are recording growth in varying degrees, while, on average, income and social inequality has risen across various groups and regions. Therefore, with the current cycles of growth volatility, the implementation of the 2030 Agenda is even more demanding, especially to achieve Sustainable Development Goal 10 of the agenda, which is to "reduce inequality within and among countries"[2] and the explicit commitment to reach "the furthest behind first".

With global integration increasing, countries are facing a greater degree of uncertainty caused by global growth cycles, financial sector crises and trade deceleration, as well from the consequences of the challenges associated with ageing societies, low levels of human capital and productivity growth, and natural disasters and climate change. Therefore, in implementing the ambitious global development agenda, countries are facing growing challenges from domestic and external forces, which significantly affect the opportunities and equal access to services for citizens to benefit from the global connectivity through finance, trade, investment and information and communication technology.

During the past decades, the impact of this uncertainty has been witnessed mostly in the forms of socioeconomic inequalities across sectors and different groups of people and across developed or developing countries. The prevalence of socioeconomic inequalities in each of the societies across different stages of development translates into a steady deceleration of economic growth prospects, which hampers the process and efforts aimed at eliminating extreme poverty in order to create a space for peaceful and inclusive societies.

The gap between the rich and the poor is widespread across all regions and growing rapidly in many countries. From the Forbes Billionaires list,[3] it appears that the combined wealth of 1,826 individuals is significantly higher than the total gross domestic product (GDP) of all least developed countries, landlocked developing

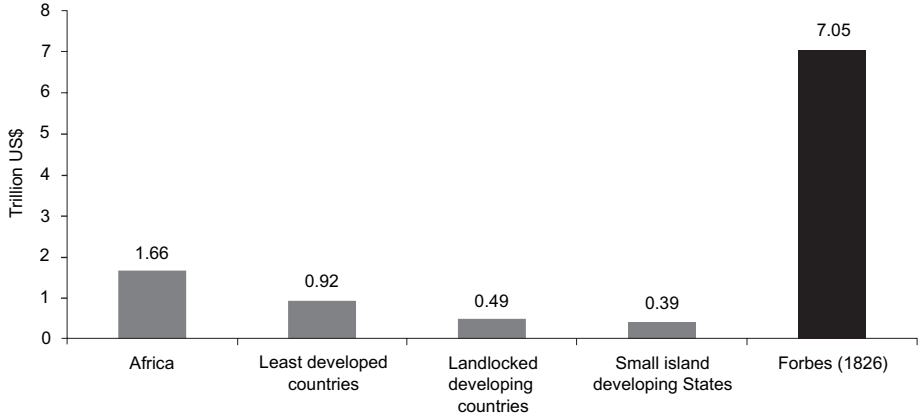
1 General Assembly resolution 70/1.

2 Ibid.

3 Available from www.forbes.com/billionaires/list/.

countries, and small island developing States, and the total GDP of Africa in 2015 (figure 1). Importantly, an analysis of the Forbes billionaires list shows that persons with a net worth of $1 billion or more accounted for 9.5 per cent of the global income in 2015. The 1,826 persons (0.00005 per cent of the global population in 2015) that are billionaires had a combined net wealth of $7.05 trillion in 2015. In some countries, the total net worth of the billionaires' net wealth was more than half that of the current level of GDP. The net wealth of the billionaires was eight times more than the combined GDP of the least developed countries ($0.92 trillion in current prices in 2015). This implies that income concentration is a major characteristic of inequality around the world.

Figure 1. Comparing billionaires net worth in selected developing countries with gross domestic product

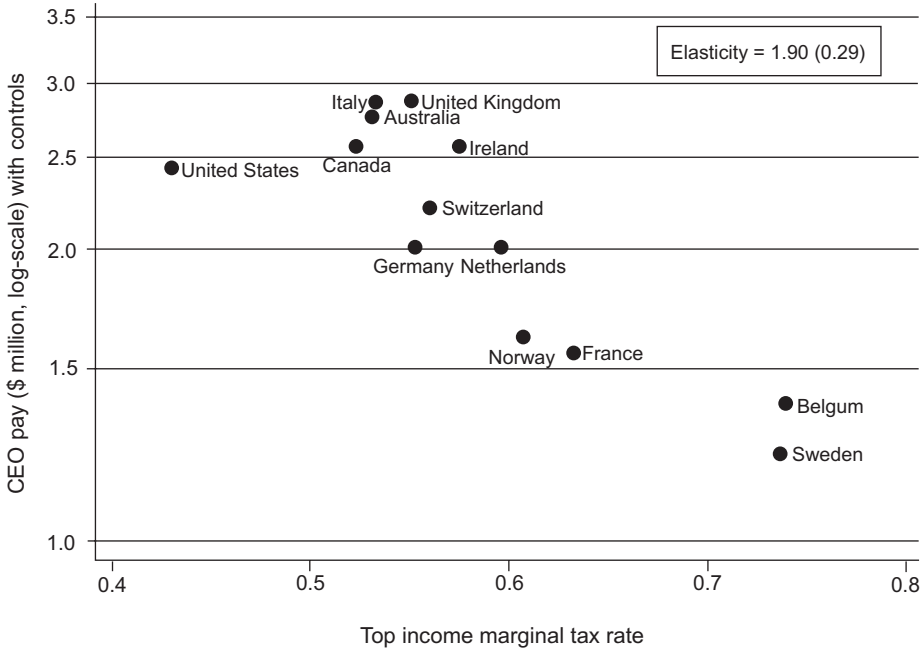


Source: Author's calculations based on Forbes online (accessed 18 March 2017) and the World Bank, World Development Indicator. Available from http://databank.worldbank.org/data/reports.aspx?source=world-development-indicators.

Addition recent evidence is that of the salaries of chief executive officers (CEOs) in various developed and developing countries, including emerging countries, and their implications to inequalities. The theory is that the compensation of top earners is not (only) determined by their productivity but also through bargaining. If top marginal tax rates decline, then the incentive for top earners to bargain harder over extra income is higher, which is why they put more effort into influencing the responsible pay committee. In this context, Piketty, Saez and Stantcheva (2014) explain this relationship through the "compensation bargaining effect" (Alvaredo and others, 2013; see also Bebchuk, Fried and Walker, 2002). They test the hypothesis by

examining the relationship between CEO compensation and top income marginal tax rates, controlling for firm performance and CEO characteristics. Furthermore, Roine, Vlachos and Waldenström (2009) have also shown that tax progressivity reduces top income shares. Indeed, they find support for their hypothesis given the strong negative relationship between CEO compensation and top income marginal tax rates (figure 2).

Figure 2. CEO pay and top income marginal tax rates



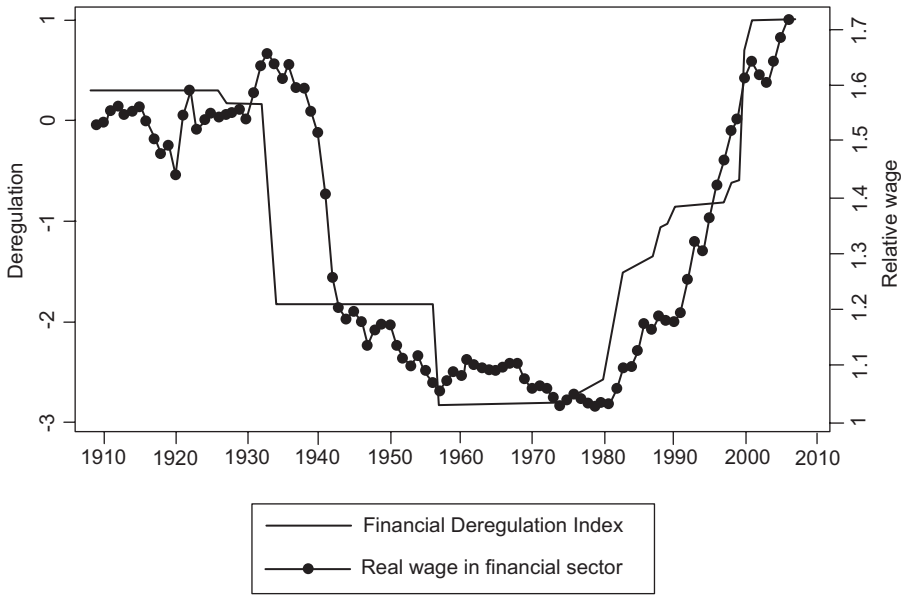
Source: Piketty, Saez and Stantcheva (2014).

Apart from taxation, social transfers, in particular conditional cash transfers, have played a role in the recent decline in income inequality in countries in Latin America, such as Brazil (Arnold and Jalles, 2014) and Mexico (Schultz, 2004).

This can be further analysed with respect to lobbying by the top 1 per cent. In particular, the financial industry is also cited as a factor behind rising income inequality and the recent global financial crisis by Acemoglu (2011), who draws upon the work of Philippon and Reshef. Philippon and Reshef (2012) find an education-adjusted wage premium of about 50 per cent for the finance sector of the United

States of America relative to other sectors in 2006. For top executives, this premium even accounts for up to 250 per cent. They also report a strong positive correlation between financial deregulation and relative wages in finance (figure 3), suggesting that financial deregulation may have contributed to the recent increase in income inequality in the United States.

Figure 3. Relationship between financial deregulation and relative wages in finance in the United States



Source: Philippon and Reshef (2012).

Although top executives in all sectors are able to extract economic rents given their bargaining power to influence their own pay (Bebchuk, Fried and Walker, 2002), executive compensation is particularly high in the financial sector globally, not just in the United States. For instance, Bell and Van Reenen (2014) and Godechot (2012) document the role the financial sector has played in the increase in the income share of the top 0.1 per cent in the United Kingdom of Great Britain and Northern Ireland and France, respectively. Bonuses have contributed to this trend, particularly in the United Kingdom (Bell and Van Reenen, 2014), but also in other Organisation for Economic Coordination and Development (OECD) member countries (OECD, 2011).

Other studies have shown that the size of the financial sector itself, as measured, for example, by private credit to GDP, stock market capitalization to GDP or bank deposits to GDP, can negatively affect income inequality (Claessens and Perotti, 2007; Roine, Vlachos and Waldenström, 2009), unless financial frictions hindering the poor from access to and use of financial service are removed (Dabla-Norris and others, 2015b).

There has been growing recognition that inequality is an impediment to inclusive economic growth, social development and environmental sustainability. First, high levels of income inequality make it more difficult to reduce poverty through economic growth. Unequal societies in terms of wealth constrain the productive capacity of the poor and the vulnerable groups along with their potential to contribute to economic growth. Second, inequality undermines social cohesion and solidarity. A growing divide between the rich and the poor is often a factor behind rising levels of crime and social unrest, as it undermines trust and weakens bonds of solidarity in societies. Third, inequality hampers environmental sustainability. In societies where inequality abounds, collective action is trumped by the pursuit of individual or vested group interest. In these societies, there tends to be less public support for policies designed to protect the environment.

The objective of the present paper is to create a new income inequality dataset covering 133 countries over the 1990-2014 period, and to provide an overview of key factors and policies related to income inequality. The paper also provides a new set of results on the income inequality trends in the United Nations regions and other classifications. It is organized as follows: section II contains an overview of the literature on income inequality, which includes reviews of the literature with a focus on the key drivers of the rising level of income inequality. In section III, there is description of the construction of a new database analysed in this paper, which has been compiled and created by using several available global data sources. The results from the analysis of income inequality are presented in section IV. Finally, concluding observations are given in section V.

II. LITERATURE REVIEW

This section provides a brief overview of a growing body of literature on inequality, especially in terms of income and social services. Figure 4 shows a clear trend of the growing body of literature that covers the issue of inequality. With the adoption of the Millennium Development Goals in September 2000, social and economic services gained further momentum, and brought the striking disparity in income in the global policy debates. It can be seen that over the years, academia and

commentators have invested time and research capacity in discussing and understanding the economics of inequality and its implications.

In particular, since the onset of the 2008-2009 Great Recession, a majority of countries have been experiencing growing income, social and wealth inequality. These countries are also facing economic, social and environmental challenges that can only be addressed through a concerted effort and forward-looking sustainable development policies. The impact of the changing patterns of productivity-enhancing and technology-based economic growth, movement of capital flows, lack of access to affordable energy services, and depressed commodity prices has resulted in falling income shares, especially of the low-skilled workers and the most vulnerable and disadvantaged communities, and has unevenly affected developing countries, especially the least developed countries. Additionally, the relatively low level of economic growth has tilted the income distribution towards the top 1 per cent and raised concerns globally. At the national level, therefore, addressing the concerns of socioeconomic inequality has increasingly become a key priority of development planners.

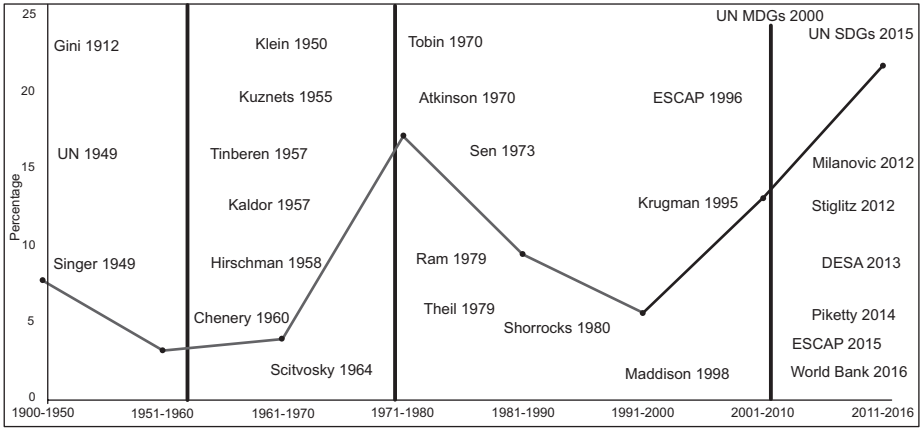
The literature on inequality has been increasing, starting in the 1990s, as compared to discussing only the issues of economic growth. The evidence suggests that beginning in the early 2000s, the focus on inequality by researchers increased in line with the growing debate on the issue of inclusive growth and sustainable development, which lead to the adoption of the Sustainable Development Goals in 2015. Since the pioneering work of Gini (1912), and in the aftermath of World War II, the implications of inequality and its associated impact on economic growth (United Nations, 1951; Singer, 1949; Klein, 1950; Kuznets, 1955; Kaldor, 1957; Tinberjen, 1975; Hirschman, 1958; Chenery, 1960; Scitovsky, 1964) have been the focus of economic literature.

During the 1970s to the 1990s, research on inequality declined with respect to the economic growth because of uncertainties related to various global economic issues. However, in the academic world, some important contributions were made during this period, especially with regard to the measurement issues of inequality under the overall context of the economic growth and development discourse (Tobin, 1970; Atkinson, 1970; Sen, 1973; Ram, 1979; Theil, 1979; Shorrocks, 1980). As noted above, in 2000, the United Nations adopted the Millennium Declaration,[4] which focused on eight time-bound and quantified targets, known as the Millennium Development Goals, to be achieved by 2015. This has led to renewed interest among researchers and think tanks to redirect their focus not only on economic issues, but

[4] General Assembly resolution 55/2.

also on the implications of economic and social policies on broader ideas and outcomes of development, especially with respect to sustainability of economic growth and development (Krugman and Venables, 1995; ESCAP, 1996, Maddison, 1998; Milanovic, 2012, Stiglitz, 2012; DESA, 2013; Piketty, 2014).

Figure 4. Tracking trends in global inequality research



Source: Computed from Google Scholar site. Available from https://scholar.google.co.th/ (accessed 18 March 2017).

Notes: Share of total number of articles on issue of "income inequality", "Gini index", and "Gini coefficient" to "economic growth". DESA: United Nations, Department of Economic and Social Affairs. MDGs: Millennium Development Goals. SDGs: Sustainable Development Goals. ESCAP: United Nations, Economic and Social Commission for Asia and the Pacific.

Finally, since the adoption of the 2030 Agenda, in which the global community adopted a goal to reduce inequality within and across countries the importance of addressing inequality has been at the heart of global public discourse (Atkinson, 2015; ESCAP, 2015; Word Bank, 2016).

The current discussion on achieving sustainable development is focusing on the issue of multidimensionality of inequality. In addition to income inequality, two other forms of inequality heavily affect poverty and prosperity: inequality of opportunity, which captures the unequal access to life fulfilment; and horizontal inequalities, which reflects the degrees of inclusion of different groups in society. Inequality of opportunities is usually associated with access to quality services for health and education. In this context, a specific area of concern is gender inequality. Regional policies and legislation that enable women to participate in economic activities specifically, and underpin gender equality more broadly, can improve the

quality of living of all women. Allowing women and men to work equally in economic activities with equal pay, and realize their full potential, is integral to a country's economic resilience and productivity. In the present paper, various aspects of inequality and their linkages to economic, social and environmental aspects are evaluated.

Inequality and growth

It is generally regarded that the higher economic growth is, the better it is for society in general. However, for income inequality, it has not always been clear to policymakers whether lower income inequality implies a better outcome for society. This is because, according to the economics literature, there are various channels through which income inequality may have a negative impact on economic growth and sustainable development outcomes.

One strand of literature highlights the trade-off between efficiency and equality in a society. Income inequality, achieved through redistribution, leads to inefficient outcomes because it entails administrative costs and lowers incentives to work (Okun, 1975; Chaudhuri and Ravallion, 2007). This would imply a positive link between income inequality – through redistribution – and economic growth. Based on the *General Theory of Employment, Interest and Money* of John Maynard Keynes (1936), people with higher income save more as a fraction of their income. If the economy is closed to a sufficient extent, this would mean that lower income inequality, achieved in the form of redistributing sources from the rich to the poor, would decrease national saving and thereby investment and economic growth.

More recent studies mention various transmission mechanisms through which income inequality actually adversely affects economic growth and other social development indicators, such as poverty or inequality of opportunities to access public services. Empirical analysis supports the negative effect of income inequality on economic growth. Barro (2000) lists three theories pertaining to how inequality can negatively affect economic growth. *First*, because of imperfect capital markets, people may not invest as much as they would like to because their limited wealth imposes borrowing constraints on them. In this case, redistribution from the rich to the poor may result in higher returns to average investment and boost economic growth. *Second*, the political economy theory (for example, Perotti, 1993; Alesina and Rodrik, 1994) suggests that higher inequality leads to greater pressure for redistribution, which is likely to distort economic decisions and investment. *Third*, a higher degree of income inequality tends to increase incentives for criminal activities and unrest (for example, Gupta 1990; Alesina and Perotti, 1996). The resulting political instability may threaten property rights and deter investment. Additionally, resources the poor use in

criminal activities and riots are directly wasted and could be used in a more productive manner.

Several recent empirical studies support the view that income inequality has a negative impact on economic growth. For example, Berg and Ostry (2011) find income distribution to be one of the most robust and relevant factors associated with economic growth duration. Ostry, Berg and Tsangarides (2014) show that lower net income inequality is robustly correlated with more rapid and more durable growth for a given level of redistribution. Dabla-Norris and others (2015a) investigate the effect of an increase in different shares of the income distribution on economic growth. They find that a one percentage point increase in the income share of the top 20 per cent is associated with a lower GDP growth by 0.08 percentage points in the following five years. On the contrary, a one percentage point increase in the income share of the bottom 20 per cent is linked to a 0.38 percentage point rise in economic growth. In a report of OECD, a similar conclusion was drawn in which it is argued that income inequality has a negative and statistically significant effect on subsequent growth. Naturally, growing income inequality may influence other inequalities, such as inequality in education or inequality of opportunities. For instance, Cingano (2014) has shown that rising income inequality impairs both the quantity and quality of education of individuals with a poor parental background, while there is no effect on the skill development of individuals from a rich parental background. Similarly, Corak (2013) outlines that rising income inequality tempers intergenerational mobility of income.

Income inequality may also adversely affect economic growth by increasing the likelihood of financial crises (Rajan, 2010; Acemoglu, 2011; Saith, 2011) and by stimulating current account deficits (Kumhof and others, 2012). In addition to economic growth on its own, higher income inequality can dampen the effect of economic growth on poverty reduction (Ravallion, 2004; Rhee, 2012). Higher income inequality may raise the power held by the elite of a country, which, in turn, may increase the likelihood that the provisions of public goods will be cut. This may further intensify income inequality as the poor tend to benefit more than the rich from the provision of public goods (Putnam, 2000; Bourguignon and Dessus, 2009).

In summary, higher inequality is therefore associated with worsening economic, social and environmental outcomes, as it hampers economic growth, fosters unrest, crime and social instability and undermines sustainable environmental governance (ESCAP, 2017).

Key factors driving income inequality

Given the negative impact rising income inequality can have on economic growth and other sustainable development factors, it is essential to understand the

underlying drivers of income inequality. There are several theories and empirical links that indicate the potential drivers of income inequality over the last decades (see Atkinson, 2015; Stiglitz, 2012; DESA, 2015; ESCAP, 2015). In this paper, some of the factors driving the income inequality across the regions are highlighted.

Trade and globalization

Frequently debated drivers of income inequality are trade and globalization. Both empirical and theoretical analyses have produced unclear results regarding the existence and the nature of the impact of trade and globalization on income inequality. While Goldberg and Pavcnik (2007), after analysing Brazil, Chile, Colombia and Mexico in the 1990s, have found no effect of trade liberalization on income inequality, while a vast majority of researchers have come up with the opposite results. The nature of this effect remains mixed.

Following the Heckscher-Ohlin theorem,[5] trade and globalization affect income inequalities differently, depending on the level of development of the country. In developed countries, which are generally more abundant in capital and skilled labour, the return to capital as well as the wage of skilled workers increases following trade liberalization, which leads to an increase in income inequality. In contrast, as developing countries are generally more abundant in unskilled labour, they experience an increase in the wages of unskilled workers and a decline in the return to capital or the wages of skilled workers. The result is a decline in income inequality following the opening of the goods market (Stolper and Samuelson, 1941). On the contrary, Milanovic (2005) finds empirically that trade openness benefits the rich relative to the poor in very poor countries, while it benefits more the middle class and the poor as the country becomes richer. Cragg and Epelbaum (1996) have also found that trade increased the wage premium in Mexico.

A study conducted by the International Monetary Fund (IMF) indicates that while financial globalization increases income inequality, trade globalization has a reducing effect. The mixed results may arise from the difficulty in disentangling the effect of globalization or trade from other factors, such as technological change (IMF, 2007). For instance, following the liberalization of trade, a developing country may

[5] According to this theory, autarky countries focus on the production of goods, which use intensively the production factor (capital, skilled or unskilled labour) that is abundant in the country. When a country opens up to trade, it exports the good which uses intensively the factor abundant in that country. This greater demand from abroad would lead to an increase in the price of the exported good and an increase in the return to the corresponding production factor relative to the pre-liberalization price levels. Additionally, the price of the imported good and the return to the factor intensively used in the production of the imported good would decline.

import technology, which, in turn, favours skilled over unskilled workers and increases income inequality. Both trade liberalization and technological change certainly play a role in this case.

According to Buckup (2017), the impact of globalization on income inequalities is inherent to countries' sectoral concentration. Indeed, if globalization of capital and knowledge enables countries to achieve greater diffusion of market power, a stark concentration of this diffusion at the sectoral or organizational level results in rising income inequalities. In this way, countries where sectoral concentration has declined in the recent decades, such as the Republic of Korea, income inequality has fallen whereas it has increased in countries, such as Norway, where sectoral concentration has intensified.

On a similar note, Hartmann and others (2017) find that countries exporting complex products (as measured by the Economic Complexity Index) tend to have lower levels of income inequality than countries exporting simpler products. These results suggest that a country's structure of production may have a limiting effect on income inequality.

Skill-biased technological change

Acemoglu (1998) provides a theoretical model that explains how technological change can benefit skilled over unskilled workers and thereby increase wage inequality if it is skill-complementary. Indeed, technological change is said to have been skill-biased over the last sixty years in the United States (Acemoglu, 2002). By complementing skills, which is generally proxied by education, technological change increases the productivity of highly educated workers relative to less educated workers and thereby increases the wage income of the former relative to the latter group, resulting in a rise in wage inequality. Greater returns to education on the back of a skill-biased technological change raise the incentives for individuals to obtain a higher education, which would result in an increase in the supply of skills (the demand for education) and, at least to some extent, lower wages of skilled workers. However, in spite of an increase in the supply of skills in the United States from the middle to the end of the twentieth century (Autor, Katz and Krueger, 1998), the college wage premium actually increased during the same period (Juhn, Murphy and Pierce, 1993; Acemoglu, 2002). This implies that demand for skills has risen even more strongly than the supply of skills. The race between schooling and technology seems to have been won by technology (Tinbergen, 1975; Goldin and Katz, 2008).

Apart from the United States, skill-biased technological change has been cited as a key driver of the rise in income inequality in Asia (Rhee, 2012) and in several OECD countries (OECD, 2011).[6] In particular, the emergence of technological changes, market-oriented economic reforms that raise skill premiums for more educated talents and reduce employment and wage prospects for low-skilled workers, raise further the income inequality across the population groups.

Demographic changes

In developed countries, demographic changes, such as in family structures, have been cited recently as factors that contribute positively to household income inequality. In OECD countries, single-headed households have risen to its highest level. Notably, these household cannot benefit from economies of scale, such as from pooling resources and sharing expenditure (OECD, 2011). Another phenomenon likely to have contributed to growing household income inequality is "assortative mating" (Greenwood and others, 2014; Schwartz, 2010; OECD, 2011). More people are marrying someone with a similar education level and income, which worsens income inequality. Examining the United States from 1967 to 2005, Schwartz (2010) finds that in the absence of the mentioned phenomenon, earnings inequality would have increased by about 25-30 per cent less than it actually has. Daly and Valletta (2006) similarly regard the increase in the number of single-headed households as a key driver of the growth in income inequality in the country.

Institutions

In a democratic political system, a country, on behalf of its citizens, would be expected to act in line with the wishes of the median voter. In a democratically restricted country, greater democracy, perhaps a widening of the voting franchise, should result in increased pressure for income redistribution as the median voter would move further down in the income ladder. The hypothesis that follows is that the more democratic a country is, the more progressive the taxation system and the lower income inequality should be (Meltzer and Richard, 1981).

Indeed, there may be situations when greater political enfranchisement actually does not lead to lower income inequality (Acemoglu and others, 2013). For instance, if social mobility is high and the right expectations hold, poor people may find it more attractive to vote against redistribution if they expect to be among the better-earning segment in the near future and if tax policy regimes are complex and regressive.

[6] See Basu and Das (2011) for further discussion on the analysis that higher level of skill and technology intensive manufactures could help increase GDP per capita in developing countries, but the impacts may vary depending on the level of institutions and other conditions of the economy.

Equally, people do not necessarily vote for a political party only based on their preference towards redistribution and income inequality. There are many other relevant policy stances, which may be more important for the voter.

Additionally, *de jure* power of a democracy does not have to be equal to *de facto* power. Bonica and others (2013) mention factors that may explain a less than expected negative relationship between democracy and income inequality in the United States. They argue that voting participation is skewed towards the top end of income distribution. For instance, of those households earning less than US$15,000 annually, less than 50 per cent of them voted in recent elections. On the contrary, of those households earning more than $150,000 annually, more than 80 per cent of them voted. The fact that a higher proportion of the poor represents non-citizens who are not eligible to vote also plays a role. Bonica and others (2013) provide further evidence that policy is more responsive to the opinions of the rich than to those of the poor. They state that if 80 per cent of the richest segment of society supports a policy change, there is a 50 per cent chance that it gets passed. However, if 80 per cent of the poorest segment is in favour of a policy change, then the chance of getting the change passed is only 32 per cent. This sheds light on the role of lobbying by the rich and in particular the financial industry. The share of the total income of the top 0.01 per cent of households in the United States is about 5 per cent, but its share of total campaign contributions amounts to approximately 40 per cent.

Structural issues

Other factors are also influencing the increasing trends in income inequality, namely (a) during the transition from agriculture to industry and services, wages vary more significantly while agricultural productivity lags behind, creating a large-scale variation across different groups of the population, as well as between rural and urban sectors, (b) decreasing bargaining power of workers as the role of trade unions and collective bargaining power have declined during the past decade, which has resulted in higher wage inequality (ILO and European Commission, 2017), and (c) credit market imperfections.

In particular, the structural issue of inequality is related to household debt. This finding conforms with recent research at IMF, which shows how inequality can lead to household indebtedness. With income growth lagging, the poorer sections of society increase debt-financed consumption. This is made possible by the availability of cheap credit, as higher income groups deposit their increasing wealth in the banking system. Such a transmission process could lead to ever-rising household debt in countries with growing inequality, making them vulnerable to shocks. As households spend more than they earn, countries face growing current account deficits, exacerbated by luxury imports by the well-off.

III. METHODOLOGY AND DATA

The analysis in the present paper is based on the measure of inequality: the Gini coefficient of inequality.

Gini coefficient

The following standard formula is used for calculating the Gini coefficient:

$$Gini = \frac{\sum_{j=1}^{N} \sum_{k=1}^{N} |y_j - y_k| P_j P_k}{2\bar{Y} \left(\sum_{i=1}^{N} P_i\right)},$$

Where y_i is country's i's relevant measure of income and/or consumption (or indicator of interest), and P_i is country's i's population. $\bar{Y}$ is the total average income and/or consumption weighted by population:

$$\bar{Y} = \frac{\left(\sum_{i=1}^{N} y_i P_i\right)}{\sum_{i=1}^{N} P_i}.$$

The Gini coefficient will give a value between 0 and 1, with 0 signifying perfect equality and 1 signifying perfect inequality.

Country groupings

This paper is based on the regional grouping of the United Nations regional classification, which is as follows: Economic and Social Commission for Asia and the Pacific (ESCAP), Economic Commission for Europe (ECE), Economic Commission for Africa (ECA), Economic and Social Commission for Western Asia (ESCWA) and Economic Commission for Latin America and the Caribbean (ECLAC). Other country groupings include classifications by development stage, income and the United Nations Human Development Index.

Data

To analyse income inequality trends, data from different sources are used with the goal to compile a database with the most reliable, time-consistent and comparable Gini coefficients possible. The Gini coefficient used in the analysis is based on household market (gross) income. Using data on the market (gross) income means that the effect of transfers and taxes is not considered. The reason for this is as

follow: while the net Gini coefficient may be a better measure of the actual income distribution, the gross Gini coefficient may be a better measure of the income distribution a country wants to achieve in the long term. In the short term, redistribution is important to increase incomes of the lower part of the distribution and thereby help them take advantage of opportunities that otherwise are restricted to the upper part of the distribution. However, the long-term goal should be to enable the highest number of citizens possible the same opportunities to participate in the production of a country and earn a decent income prior to redistribution. Additionally, this paper focuses on developing countries. Although the actual (net) income distribution may significantly differ from the market (gross) distribution in a number of developed countries. As the net Gini coefficient is usually lower than the gross Gini coefficient in several developed countries, this deviation is less significant in developing countries (where redistribution is usually of a limited size measured as per cent of GDP).

In preparing the dataset for income inequality, the "All the Ginis" dataset for ECLAC and data from the Statistics Division of ESCAP for ESCAP are used because the two data sources provide fairly complete data directly from household surveys for most countries in the region for the period 1990-2014. This makes it possible to bypass various limitations of the Standardized World Income Inequality Database (SWIID, version 5.1) for some developing countries. For ECA and ESCWA, data from SWIID are used because no reliable source with fairly complete data over the years are available and SWIID provides the most complete estimates. For ECE, data from SWIID are used because it consists of data from the Luxembourg Income Study, which covers data from household surveys for most member States of ECE, as a standard. The Luxembourg Income Study is generally regarded as a very reliable source.

It should be noted that while estimates from SWIID are based on a household adult-equivalent scale (Solt, 2016), this study has almost exclusively drawn on data based on the household per capita income level from the "All the Ginis" dataset (Milanovic, 2014). It is assumed that the difference is negligible although for within-region comparisons over time, the different household equivalence scale is not crucial as the same data source for each United Nations region is used throughout the period under review.[7]

[7] SWIID uses the Luxembourg Income Study as a standard and combines data from various sources to generate estimates of market and net income Gini coefficients for a wide range of countries over time. Its aim is to maximize the comparability of income inequality data while maintaining the largest coverage possible across countries and over years. While it outperforms other available datasets on income inequality based on coverage of countries and years and has predicted Luxembourg Income Study data well, it should be noted that a limitation of SWIID is that for developing countries, estimates are mainly based on data observed in other countries.

Thus, the same data source for the whole period for each United Nations region is used, but different sources are used for different regions. It follows that when comparing Gini coefficients of different United Nations regions or countries from different United Nations regions, the analysis should focus on the trend over time rather than the absolute value, as values are consistent over time for each region and country but not completely consistent across regions because of the different data sources used.

Simple and population-weighted Gini coefficients are calculated based on different classifications: United Nations region (for example, ESCAP), the United Nations development stage (for example, least developed countries), the World Bank income classification (for example, lower-middle income) and the United Nations Human Development Index (for example, high-human development). Gini coefficients are calculated per country for five-year periods, namely 1990-1994, 1995-1999, 2000-2004, 2005-2009 and 2010-2014. In all the periods, the data that are available for at least one year of the period for a particular country are included. For the United Nations development stage classification, countries are clustered into country groups according to a country's status. For the World Bank income classification, countries are clustered into country groups based on a country's status in August 2016. For the United Nations Human Development Index classification, countries are clustered into country groups based on a country's average of the available Human Development Index data in 2015. To calculate population-weighted Gini coefficients, population data are drawn from the United Nations. In total, the final database used for the analysis comprises 133 countries. This empirical evidence clearly provides a unique opportunity to explore in-depth a rich and newly created dataset on income inequality for 133 countries from all regions, developed and developing countries, over the period 1990-2014.[8]

IV. RESULTS

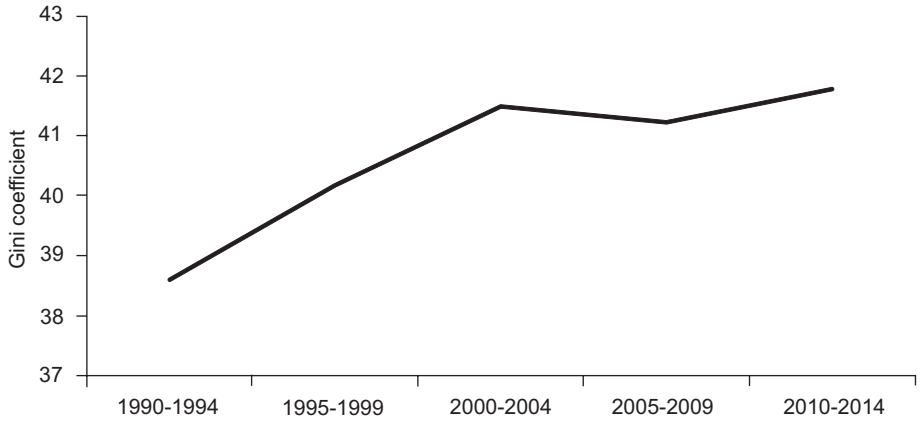
This section presents the trends and patterns of global income inequality since the 1990s according to the United Nations regional commission classification, the level of development and income of countries, and the Human Development Index.

[8] The full set of the Inequality database is available upon request from the author.

Global analysis

Globally, based on a sample of 133 countries, market income inequality has increased from the early 1990s to the late 2000s, as indicted in figure 5. The population-weighted Gini coefficient was about 38.6 during the period 1990-1994; it rose to 41.8 in the 2010-2014 period. Even though there was a small change during the periods 2000-2004 and 2005-2009, the overall increase from 1990-1994 period to the 2010-2014 period corresponds to a 3.2 per cent increase.

Figure 5. Global population-weighted Gini coefficient based on market income, 1990-2014



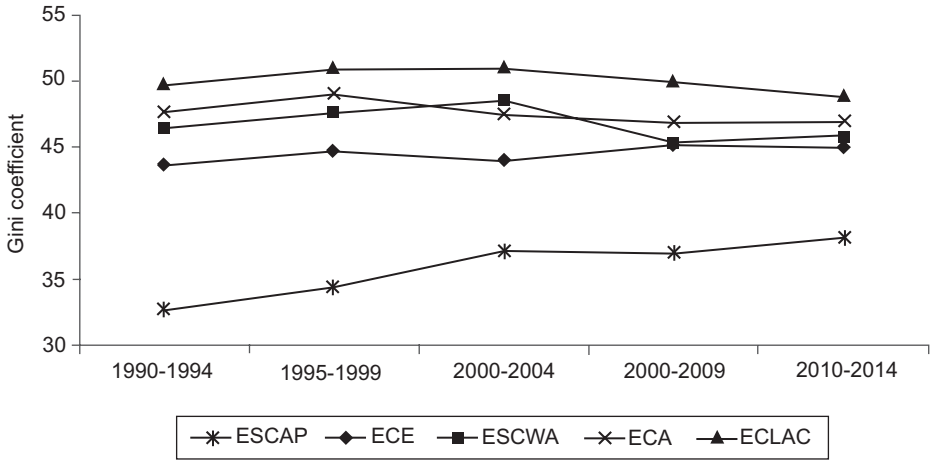
Source: Author's calculations.

Regional analysis

Figure 6 shows the population-weighted market income Gini coefficient in five periods between 1990 and 2014 for the five United Nations regions. Contrary to the global trend, ECA experienced a decline in market income inequality during the same period. In the 2005-2009 period, the market income Gini coefficient was lower than the one of the ECE region. The latter region experienced a 1.4 per cent increase over the past decade. Market income inequality in ECLAC increased marginally during the period 2000-2004, but then went down in the following periods. Despite the recent slight decline, ECLAC remained the region with the highest income inequality throughout the two decades, with the market income Gini coefficient being just above 50 in the most recent period. While ESCWA exhibited an increase in market income inequality from the early 1990s to the early 2000s, the level decreased in the latest

period. The market income Gini coefficient of ESCAP rose sharply, by 5.4 per cent, from the period 1990-1994 to the period 2010-2014. Although the increase, which was mainly driven by China and India, is the largest among the five regions, the level of market income inequality in ESCAP was still low compared to ECLAC, ECE, ECA and ESCWA.[9]

Figure 6. Trends of the market income Gini coefficient, 1990-2014, regions



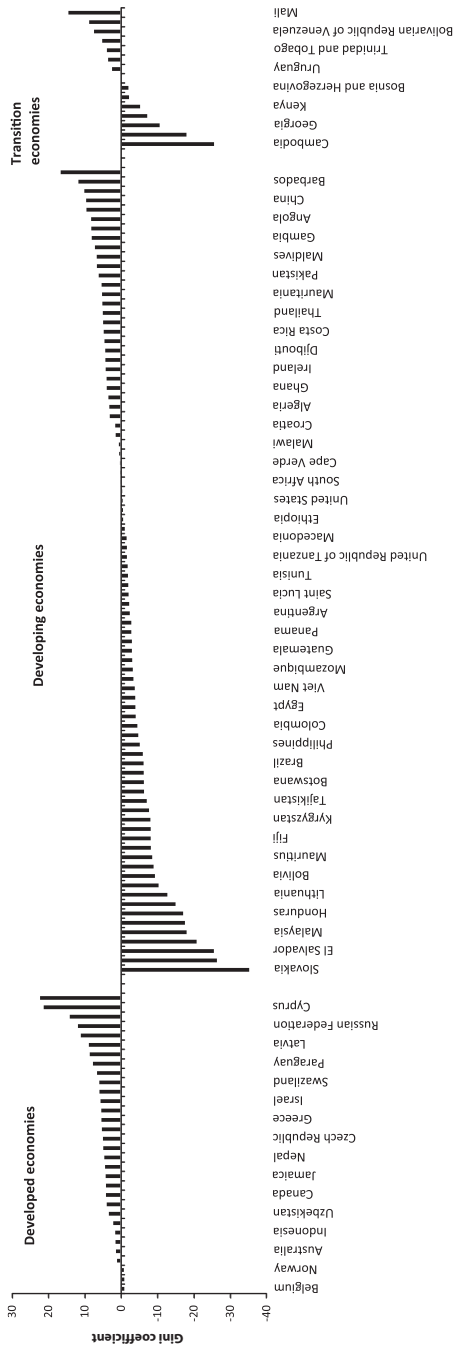
Source: Author's calculations.

At the national level, figure 7 presents the fact that income inequality (as measured by the Gini coefficient) had different patterns across countries over the past two decades.

By comparing the compound annual change from the 1990s to the 2000s, the data show that in the majority of developed countries, income inequality has steadily increased, while in developing countries, the evidence has been mixed, depending on the region. In particular, for major developing countries, the evidence shows that there is a large difference in income inequalities and that income equalities have increased in varying degrees over this period of unprecedented global growth mixed with heightened financial market uncertainty.

[9] ESCAP (2017) notes that "in addition, income inequality has been growing in China, India, Indonesia and the Russian Federation, among other countries, leaving more than 60 per cent of the region's population to live in countries where income inequality is increasing".

Figure 7. Compound annual change in Gini coefficient, 1990-2014



Source: Author's calculations.

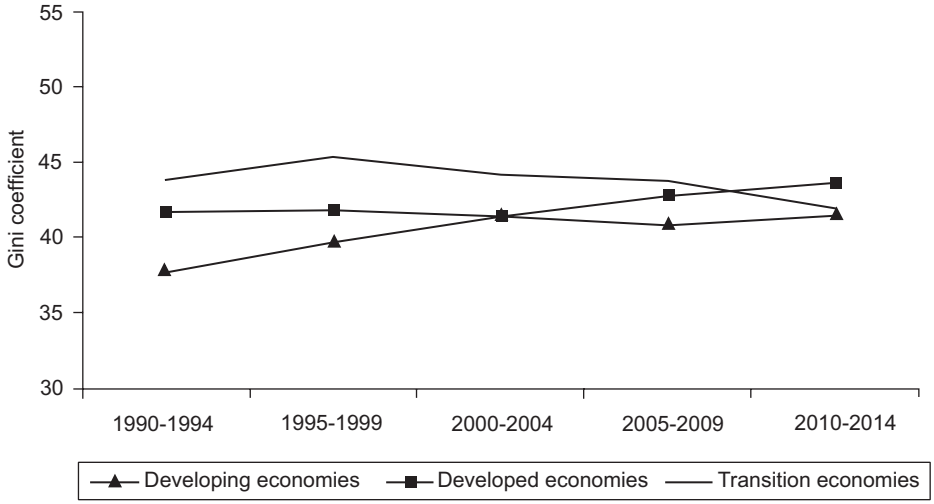
Notes: Countries are classified according to the United Nations data sources as indicated in the annex.

Development stage and income-based analysis

This section describes the trends of market income inequality of country groups, which are in a different United Nations development stage and are classified differently based on the World Bank income classification.

Figure 8 shows the market income inequality trend for developed, developing and transition countries. While both developed and developing countries experienced an increase in market income inequality from the 1990-1994 period to the 2010-2014 period, the population-weighted Gini coefficient tended to go down in transition economies. Developed countries, on aggregate, had the highest level of market income inequality throughout the whole period, while the increase in the Gini coefficient for developing countries was mainly because of the increases for China and India. However, it should be noted that those countries on aggregate have the highest level of redistribution as well.

Figure 8. Trends of the market income Gini coefficient, 1990-2014, level of development

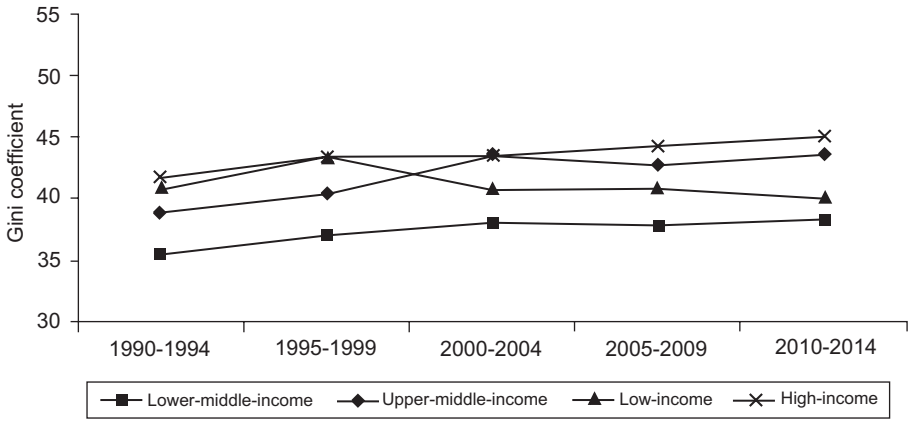


Source: Author's calculations.

Figure 9 shows the evolution of the population-weighted market income Gini coefficient from 1990 to 2014 by the World Bank income classification. For example, high-income and upper-middle-income countries show a rise in income inequality over the 25-year period, although upper-middle-income countries, on aggregate, exhibited

a decline after peaking during the period 2000-2004, but it is again picking up. While lower-middle-income countries similarly experienced a slight steady increase from 1990 to 2014, in low-income countries, market income inequality, on average, decreased gradually. As far as the level is concerned, lower-income countries seem to have a lower market income Gini coefficient than higher-income countries.

Figure 9. Trends of the market income Gini coefficient, 1990-2014, income classification



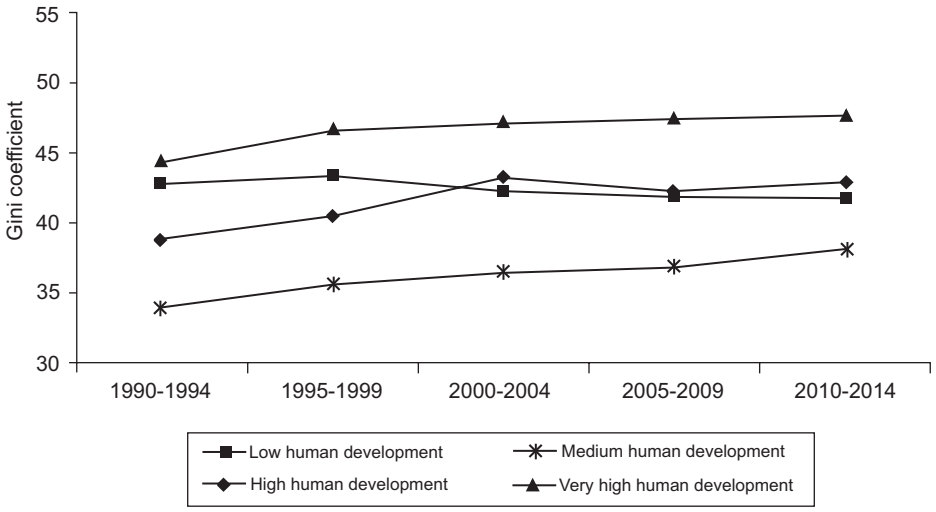
Source: Author's calculations.

Human development-based analysis

In the last step, the population-weighted market income Gini coefficients for country groups with a different level of human development is computed, as measured by the United Nations Human Development Index. The index is composed of measures of life expectancy, education and per capita income. Figure 10 shows the trends for country groups, which, on average, had a very high (value > 0.8), high (0.7-0.8), medium (0.5-0.7) and low (< 0.5) HDI in the 1990-2014 period. When comparing the trends of the four categories, the picture seems less clear.

Countries with a very high Human Development Index exhibited an increase in the market income Gini coefficient and had the highest level throughout the entire period, similar to the scenarios mentioned above. However, income inequality in high Human Development Index countries decreased after an increase in the period 1995-1999. While the Gini coefficient in low Human Development Index countries went down from 1990 to 2014, countries with an average medium Human

Figure 10. Trends of the market income Gini coefficient, 1990-2014, Human Development Index



Source: Author's calculations.

Development Index exhibited a rise but the Gini coefficient was still lower that other groups of countries.

V. CONCLUDING REMARKS

The present paper has provided an overview of key literature describing the relationship between income inequality and economic growth, relevant drivers of income inequality based on theory and empirical analysis. It included a discussion of global income inequality, by using Gini coefficient trends over the period 1990-2014, using a dataset of 133 countries. The dataset was compiled from different available income inequality databases in order to obtain a broader set of comparable data over time within each United Nations region and to some extent still maintain comparability across United Nations regions.

The findings show that globally, based on the population-weighted market income Gini coefficient, income inequality has increased from the 1990 to 2014. By the United Nations regions, however, the trends have been diverse. While the African United Nations region has experienced a decline in market income inequality, both the European and Asia and Pacific regions of the United Nations recorded increases in

market income inequality. The population-weighted market income Gini coefficient of the United Nations region of Western Asia has been declining, while the Gini coefficient for the Latin America and Caribbean region remained high during the period even though the Gini coefficient had declined between the periods.

As far as the classifications by the United Nations development stage, the World Bank income and the United Nations Human Development Index are concerned, on average, the developed and richer countries tended to experience increases in market income inequality. While middle-income countries also experienced an increase in the market income Gini coefficient, market income inequality in transition economies declined.

While it should be noted that analysis in this paper is merely of a descriptive nature and no causation or correlation has been shown between income inequality and GDP per capita or other social and environmental outcomes, a few policy suggestions can be made keeping in view the sustainable development goals and targets:

- For the increase in market income inequality of high-income countries, available literature suggests that skill-biased technological change has played a role. However, deregulation and increasing compensation of executives in the financial sector and institutions also appears to have contributed to market income inequality in many countries, particularly in developed economies.
- Middle-income countries also went through two decades of rising market income inequality. With China and India being part of this group, key explanations likely include skill-biased technological change alongside trade liberalization. Least developed countries and small island developing States, on average, recorded a slight increase in market income inequality between 1990 and 2014. The landlocked developing countries, on average, experienced a slight decline during the same period. The structural transformation is essential to overcome many of the economic and social policy constraints in these economies, while taking into account the opportunities from technological advancements in the national development planning processes.
- Redistributionary policies, such as conditional cash transfers, may have limited the increase or even accounted for a decline in market income inequality in some countries. However, it should be noted that a rise in income inequality, measured by the market income Gini coefficient, does not always mean that certain segments of the population have suffered. For instance, if only the top 10 per cent of a population increased their real

income over a certain period and the other 90 per cent maintained the same real income, income inequality would go up, even though no one would be worse off than at the beginning of the period. Still, in the longer term, countries need to ensure that economic growth is shared by everyone. This may be achieved through redistributionary policies or by structural transformation policies, among others, so that all people benefit from the 2030 Agenda.

With the adoption of the 2030 Agenda, there is no doubt that countries will redouble their policy focus to increasingly address the issue of growing income inequality as part of their national transformative process. Importantly, this paper paves the way for undertaking further research in the area of income inequality as it contains a reliable and consistent panel dataset covering 133 countries over the period 1990-2014.

The findings of this paper clearly indicate that various regions' past record in lowering economic and social inequality has been less than impressive despite solid economic growth and reduced poverty. From the policymakers' point of view, looking ahead, the changing global, regional and national economic and business prospects would make the task even more demanding.

As countries become more knowledge-based, ageing societies emerge, climate change intensifies, and growth in developed economies adjusts to a lower rate, more people could be left behind while the fiscal burden to ensure equal opportunities and social protection will likely rise in the developing countries, especially in the least developed countries. Without a doubt, policymakers will consequently have to put more effort into overcoming these socioeconomic inequalities. If income and non-income inequality are left at high levels for an extended period of time, it would not only impair the positive impact that economic growth has on poverty reduction but it would also risk causing social tensions and unrest, which, in turn, could derail the development process, and adversely affect progress made in building and sustaining inclusive and peaceful societies. It is encouraging to note that countries are increasingly recognizing the importance of this issue and placing inequality at the core of their national development processes and planning frameworks.

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Annex

United Nations regional classification

Economic Commission for Europe (ECE)	Albania, Austria, Belarus, Belgium, Bosnia and Herzegovina, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Finland,[c, f] France,[c, d] Germany,[c] Greece, Hungary, Iceland, Ireland, Israel, Italy,[c, e] Latvia, Lithuania, Luxembourg, Republic of Macedonia, Moldova, Netherlands,[c] Norway, Poland, Portugal,[c] Romania, Slovakia, Slovenia, Spain,[c] Sweden, Switzerland, Ukraine and United Kingdom[c, d]
Economic and Social Commission for Western Asia (ESCWA)	Egypt,[a] Jordan, Lebanon, Morocco,[a] Syrian Arab Republic, Tunisia,[a] Yemen
Economic Commission for Latin America and the Caribbean (ECLAC)	Argentina, Barbados, Bolivarian Republic of Venezuela, Bolivia (Plurinational State of), Brazil, Canada,[b] Chile, Colombia, Costa Rica, Dominican Republic, Ecuador, El Salvador, Guatemala, Guyana, Haiti, Honduras, Jamaica, Mexico, Nicaragua, Panama, Paraguay, Peru, Saint Lucia, Suriname, Trinidad and Tobago, United States[b, c, d] and Uruguay
Economic and Social Commission for Asia and the Pacific (ESCAP)	Armenia,[b] Australia, Azerbaijan,[b] Bangladesh, China, Fiji, Georgia,[b] Indonesia, India, Iran (Islamic Republic of), Kazakhstan,[b] Kyrgyzstan,[b] Cambodia, Lao People's Democratic Republic, Maldives, Mongolia, Malaysia, Nepal, Pakistan, Papua New Guinea, Philippines, Russian Federation,[b] Sri Lanka, Thailand, Tajikistan,[b] Turkey,[b] Uzbekistan[b] and Viet Nam
Economic Commission for Africa (ECA)	Angola, Algeria, Botswana, Burkina Faso, Burundi, Cameroon, Cabo Verde, Central African Republic, Côte d'Ivoire, Djibouti, Ethiopia, Gambia, Ghana, Guinea, Guinea-Bissau, Kenya, Lesotho, Madagascar, Malawi, Mali, Mauritania, Mauritius, Mozambique, Namibia, Niger, Nigeria, Rwanda, Senegal, Sierra Leone, South Africa, Swaziland, Uganda, United Republic of Tanzania, Zambia and Zimbabwe

Sources: ECE: www.unece.org/; ESCWA: www.escwa.un.org/; ECLAC: www.cepal.org/en/; ESCAP: www.unescap.org/; and ECA: www.uneca.org/.

Notes:
[a] Member States of ECA.
[b] Member States of ECE.
[c] Member States of ECLAC.
[d] Member States of ESCAP.
[e] Excluding the Holy See and San Marino.
[f] Including Åland Islands.

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DO OWNERSHIP STRUCTURES REALLY MATTER? A STUDY OF COMPANIES LISTED ON THE INDONESIA STOCK EXCHANGE

*Nila Firdausi Nuzula and Chitra Sriyani De Silva Lokuwaduge**

Examining the ownership structure of Indonesian corporations and its contribution towards developing appropriate corporate governance is an interesting endeavour, as the country is putting a lot of effort in improving trusts and attracting more foreign investors. A concentrated ownership structure is a common feature in the Asia-Pacific region. For the present paper, an analysis was conducted centred on ownership structures and their impact on governance and firm value in Indonesia. Measurements for ownership structure were based on the percentages of institutional and managerial ownership, while independent commissioners, board of directors and audit committees were used to measure corporate governance and Tobin's Q was used to measure firm value. The results of the study, which is based on secondary data gathered from all the companies listed on the Indonesia Stock Exchange from 2009 to 2016, reveals that ownership structure affects two measures used for corporate governance and firm value. As expected, ownership structure shows a statistically significant relationship with corporate governance.

JEL classification: G00, G190, G320, G390, O53.

Keywords: Corporate governance, institutional, managerial, ownership, firm value, Indonesia, share-market.

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I. INTRODUCTION

Indonesia has enormous growth potential because of its extensive natural resources and manpower. At the start of 2012, it was the largest economy in South-East Asia and the eighteenth largest economy in the world. The main contributors to economic development in the country during the 1980s and 1990s were large corporations owned by conglomerates. These entities tended to practice poor corporate governance. Following the financial crisis in 1997, the importance of reforming corporate governance to overcome the crisis and attract more foreign investment to Indonesia was recognized. Claessens and Fan (2002) noted that weak corporate governance in Asia was the result of a combination of ownership structure and the property rights systems, including lack of law enforcement. Large ownership potentially expropriated minority rights and was not adequately convincing to reduce the agency problems in Asia. Tabalujan (2002) explains that the high levels of Indonesian family connections in corporate management are an indication of the potential influence they have on corporate governance.

While in the current globalized economy, average duration of equity holdings has declined in major companies in English-speaking countries and the shareholders are more dispersed (Sikka and Stittle, 2017); corporations in Indonesia have experienced minimal change in their ownership structure. Known as a country with dense family shareholdings and government intervention, many companies in Indonesia are controlled by a small number of families and exclusive groups (Claessens, Djankov and Lang, 2000; Zhuang, Edwards and Capulong, 2001; Claessens and Fan, 2002). The positive value of family ownership is that it allows group members in conglomerates to quickly make strategic decisions. Coordination is also easier through informal communication and family channels. However, the intensity of business control in the hands of few families has become a high cost factor, resulting in a disorganized legal and judicial system.

Dispersed ownership makes it more difficult for shareholders to control companies (Sikka and Stittle, 2017) and the monitoring of the company become more widely distributed among shareholders. Global developments with regard to corporate governance is an interesting topic, expecially in Indonesia. Therefore, in the present study, up-to-date situations in Indonesia are described and the following questions are investigated: Is ownership a factor in increasing shareholder value? If so, which type of ownership is more effective in increasing shareholder value? This paper includes a study on the relationships among ownership structure, corporate governance and firm value. Also in the paper, objectives are set to examine whether those variables are correlated, and if the different types of corporate ownerships have a direct relationship with the improvement of firm value.

The authors find that two types of ownership, institutional and managerial ownerships, have significantly different impacts on corporate governance in Indonesia. Large institutional shareholdings represent a company that has an adequate monitoring scheme, although raising the percentage of managerial ownership may conflict with the current large shareholders' interests. Board of directors and audit committees are two measurements of corporate governance that affect firm value, while the presence of independent commissioners has no effect on the firm value. Another result is that ownership structure negatively affects firm value, implying that investors in the Indonesia Stock Exchange are not enthusiastic about investing in companies with a high concentration of instutional holdings.

The remainder of this paper is structured as follows. The next section contains a discussion on literature on the relationships between ownership structure, corporate governance, and firm value. Section III includes an outline the methodology and sampling technique applied. Section IV consists of a description of the results and an accompanying discussion, and the last section concludes the paper.

II. LITERATURE REVIEWS AND THE DEVELOPMENT OF HYPOTHESES

Zhuang, Edwards and Capulong (2001) explain that the quality of corporate governance is closely related to the ownership structure of a company. A survey they conducted shows that the characteristics of controlling shareholders in Indonesia vary to include individuals, families, holding companies or financial institutions. Corporations are dichotomous between the ones owned by local and foreign investors and between official related and non-official groups. Official-related groups are founded by people who are allied with former or current government officials. As Indonesia has the largest number of companies controlled by a single family among countries in the Asia-Pacific region, families retain control of the companies through ownership, management, or both, although some groups employ outside managers. If the family members cannot actively control the companies as the directors, they maintain their position as commissioners, which, in Indonesia are tasked with supervising the firm. When the controlling management becomes ineffective, it may be the result of several factors, including, among them, inadequacy of the regulatory framework supporting financial liberalization, heavy reliance on bank credits to finance investment and high ownership concentration among families with political affiliations, which is a factor that led to the severe financial crisis in Indonesia in 1997. To get out of the crisis, the Government recommended applying a corporate governance framework, which included protecting the rights of minority shareholders, improving the legal and regulatory agenda for bank supervision and protecting creditor's rights.

The main objective of corporate governance principles is to mitigate inter-agency conflicts, which may arise between managers and shareholders in firms through internal and external mechanisms (Jensen and Meckling, 1976). The conflicts usually occur when ownership is dispersed among a large number of shareholders, or between the controlling and minority shareholders in firms with a concentrated ownership structure (Shleifer and Vishny, 1997). Claessens and Fan (2002) further explain that the nature of the ownership structure in a company affect the nature of the problems between managers and outside shareholders. Diffused ownership, which is commonly seen in the United Kingdom of Great Britain and Northern Ireland and the United States of America, ultimately leads to conflict of interest between outside shareholders and managers who hold a limited amount of equity, while concentrated ownership, which is typically found in Asia, ultimately leads to conflicts between the controlling shareholder (who is often also the manager) and minority shareholders.

By building the link between ownership and corporate governance, Tabalujan (2002) has proposed that Indonesia serve as an example for the third model of corporate governance, which follows the market-based governance system practiced by corporations in Australia, Canada, the United Kingdom and the United States and the relationship-based governance system practiced by corporations in France, Germany and Japan. The third model is referrred to as family mercantilism, family business group or personal capitalism, as it is based on a family business in which the ownership and management are controlled by a family group, either nuclear or extended. The main ownership remains inside the group, with shares being distributed among the family members. Becaused of the close relationships of families, the concept of family values in Indonesia may have a greater impact on family capitalism as it is already formally well-recognized in daily business practices.

Tabalujan (2002) explains that the corporate governance system in a family business context is different from where the system originated. For example, accountability is referred to as collective, instead of individual accountability, by which family board members view and accept responsibility for their corporate functions. As western corporate governance follows a view that shareholders are distinct from the company and liable only to the extent of the value of their invested capital, the family approach calls for no separation between shareholders and the corporate entity. What is suffered by the company is felt by the shareholders. Any assets or gains of the company are also available to shareholders. Following the Chinese traditional view, a corporation may be more a nexus of a relationship rather than a nexus of contracts. Under this context, difference patterns of ownership and control rooted in being ethnocentric affects the system of corporate governance. Therefore, according to Claessens and Fan (2002), an alternative corporate governance mechanism is

required to improve the effectiveness of the framework applied in a system, particularly when the system is hit by a large crisis in locations where regulating institutions are weak and property rights are limited. This current research is aimed at examining how ownerships in Indonesia will affect the corporate governance of companies and firm value.

Ownership structure and corporate governance

Jensen and Meckling (1976) wrote the leading article on the conceptual relationship between property rights, agency theory and finance theory, which is used to develop a theory of ownership structure. A firm is a nexus for a set of contractual relationships, including a multitude of complex relationships between the firm (as legal fiction), such as a contract between principals and agents, and management and suppliers. It covers firms' contracts with various "inside" and "outside" stakes. In addition, the separation of ownership and control raises agency costs and problems, making the agency relationship non-optimal and inefficient. However, as the ownership becomes more concentrated, agency problems and costs decreases, and value-maximization increases.

The first proposition in this paper is that ownership structure has an influence on to what extent corporate governance is applied in Indonesian companies. Two proxies of ownership structure used are institutional and managerial ownerships, while three indicators of corporate governance are the proportion of independent commissioners, the number of board of directors and the presence of an audit committee. Shleifer and Vishny (1997) explained that ownership had greater capacity to monitor and issue voting rights, which made it possible for it to take corrective action to improve corporate governance practices in companies. Using the scheme, it is suggested in this study that institutional shareholding, which usually holds a large amount of stocks, can mitigate agency problems because they have strong motivation to monitor and discipline management. Therefore, this type of ownership can lead to better practices of corporate governance principles. Meanwhile, a significant percentage of managerial ownership has such an opportunity to ensure the improvement of corporate governance practices in the firms, as demanded by the stock market authorities.

Baker and Anderson (2010) explain that in many countries and in companies with a range of ownership structures, institutional shareholders are often influential. They comprise banks (as showed by *keiretsu* networks in Japan), sovereign wealth funds owned by governments, private equity firms, and hedge funds. The authors also state that families form the largest shareholders around the world. Because of the prominent role of family businesses in the allocation of resources, many studies have

scrutinized the impact they have on developing a corporate governance system in the companies, and correlated it with measures of economic output and firm value.

Studies conducted on the relationship between firm ownerships and corporate governance have come up with various results. In a study on Singaporean companies, Chen and Ho (2000) has found out that agency problems are more severe in firms with low managerial ownership. A substantial number of outside shareholders do not effectively control the agency problems. Institutional shareholders enhance firm value, as they tend to push listed companies to have better monitoring mechanisms (Mollah, Al Farooque and Karim, 2012). Morck, Shleifer and Vishny (1988) explain that the linear relationship reflects the convergence of interest between managers and shareholders and the limited level of agency problems. However, no studies have examined the contribution of managerial ownership to the improvement of corporate governance practices. This gap in such empirical studies is hopefully closed by this study. Therefore, the first proposal of this study is to examine the following hypothesis.

H_1: Ownership structure influences corporate governance

Corporate governance and firm value

The second proposal in this paper is that good practices of corporate governance can make daily activities in companies unbiased, efficient and goal oriented, and ultimately, increase shareholders' wealth. In this study, the authors propose that the appropriate proportion of independent commissioners, number of board of directors, and an audit committee represent good practices of the principles of corporate governance. Disclosing the measurement numbers in the firms' annual financial reports can raise the firms' value. Investors appreciate this effort and it consequently has a positive impact on the market value of the equity.

Some studies have examined the influence of corporate governance on firm value. However, they have provided contradicting results. Bai and others (2003) have found a meaningful correlation between the governance mechanisms and market valuation of public companies in China. They constructed a corporate governance index and applied Tobin's Q as the market value indicator. The findings indicate that investors pay a significant premium for well-governed firms in China. Carter, Simkins and Simpson (2003) use board diversity as the dimension of corporate governance, and relate it to firm value. The findings show that there are significant positive relationships between the fraction of women or minorities on the board and the value of the firms. Baek, Kang and Park (2004) study corporate governance practices in concentrated family ownership in the Republic of Korea. The study results indicate that firm-level differences in corporate governance indicators determine the change in

firm value during a crisis. In that situation, the equity values of chaebol firms with concentrated ownership by controlling family shareholders plunged more. Mollah, Al Farooque and Karim (2012) propose that an appropriate audit committee and larger membership on the board of directors ensure better governance and hence improve firm value. However, another finding of the study indicates that board characteristics variables have an insignificant relation with performance. The finding is interesting as normatively the size of the board implies levels of ability to increase a firm's value Therefore, in this current study following hypothesis is proposed as the next analysis.

H_2: Corporate governance influences firm value

Ownership structure and firm value

The third proposition in this paper is that ownership structure creates firm value. Two proxies of ownership structure, institutional and managerial shareholdings are used in this study to examine the relationships of these variables to firm value. A substantial number of institutional shareholding represent high density of the monitoring mechanism delivered by shareholders and controlling managers to achieve the objective to increase shareholders' wealth. This creates the high probability that the firms attain high value. Abdallah and Ismail (2017) state that ownership structure affects a firms' performance. Ownership concentration mitigates agency problems as the major shareholders have an acceptable authority of exercise over the firm's management.

Meanwhile, the relationship between managerial share-ownership with firm value has two meanings. Managerial shareholding helps to align the interests of managers and shareholders, and then lower agency costs, and it deters managers' engagement in profitable projects and manageable level of risks. As a result, there is positive relationship in which substantial percentages of managerial shareholding can increase firm value. On the other hand, the presence of managerial shareholding at a high level may create "entrenchment effects" in which managers can protect their non-diversifiable human capital and wealth invested in the firm at the expense of outside investors (Morck, Shleifer and Vishny, 1988; Margaritis and Psillaki, 2010). Therefore, the relationship between these two variables is predicted to be negative as the rise of managerial ownership may decrease firm value.

Other papers have shown different results on this issue. Jensen and Meckling (1976) explain the presence of the "convergence-of-interest" hypothesis that major management ownership increases firms' market values. A high percentage of management ownership allows the cost of deviation from the value-maximization target to decline. Morck, Shleifer and Vishny (1988) found that firm value measured by Tobin's Q increased in line with an increase in the board ownership to 5 per cent.

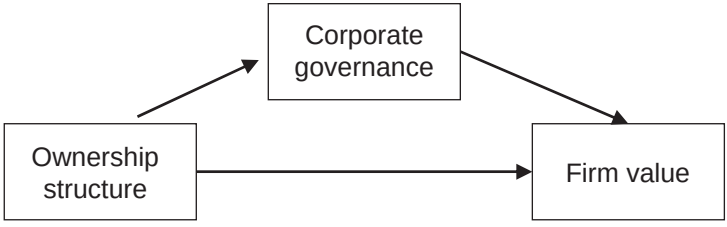
However, the value fell as the ownership rose further to 25 per cent and continued to increase slowly when board ownership topped 25 per cent. Chen and Ho (2000) found that ownership structure measured as the total percentage holdings of directors had an impact on the Tobin's Q. Lins (2003) studied 1,433 firms from 18 emerging markets and found that firm values are lower when management holdings exceed cash flow rights. Mollah, Al Farooque and Karim (2012) explain that managerial share ownership is representative of the presence of managerial control.

In terms of institutional ownerships, some studies have also come up with mixed findings. Lins (2003) shows that in low shareholder protection countries, large non-management control rights blockholdings are correlated positively with firm values, suggesting that a high percentage of large shareholdings leads to an increase in firm values. Baek, Kang and Park (2004) explain that during the financial crisis in the Republic of Korea in 1997, firms with higher ownership concentration by unaffiliated foreign investors experienced a slight decrease in their share value. Minguez-Vera and Martin-Ugedo (2007) has found a non-significant relationship between major shareholders as an institution and firm value. Interestingly, the study indicates that the concentration of shareholdings does not affect the value of the firm. The study results show that major institutional ownership adversely affects a firms' financial performance and value, while dispersed ownerships improves a firm's performance and mitigates agency problems in the Botswana stock market. These variations in the results present the opportunity to study this issue further. Therefore, for this study, the third hypothesis is as follows.

H_3: Ownership structure influences firm value

In summary, the structure of the relationship between these three variables is illustrated in this following model.

Figure 1. General relationship model



III. METHODOLOGY AND SAMPLE

First, for this study, all public companies listed on the Indonesia Stock Exchange (IDX) over an eight-year period spanning from 2009 to 2016 are used as the initial sample. Financial data are gathered using the annual reports of the listed companies published on the IDX website (www.idx.co.id/index-En.html). In this study, observations with unavailable data are excluded. As a result, the number of observations varies according to the availability of data, as illustrated in table 1. Base on the selection criteria, the sample consists of 425 listed companies with 1,700 firm year observations.

Assessing the level of corporate governance practiced in an individual company may be subjective. Therefore, for this study quantitative measurements are applied to minimize this problem. Two measurements of ownership structure are tested: institutional and managerial ownerships. Institutional ownership (institutional) represents percentage of shares held by large shareholders, including State-owned shares and shares held by parent companies. Managerial ownership (management) represents the percentage of shares owned by the managers of the companies. Four variables are used as proxies of corporate governance, namely the proportion of independent or external commissioners as a percentage of total commissioners (IC) during one accounting period; the number of independent members in audit committees (AC) and board of directors (BOD). International Finance Corporation (2014) finds that the number of directors and percentage of independent commissioners are suitable indicators to measure good board practices in Indonesia. Finally, Tobin's Q (TobinsQ) is applied to measure firm value. Tobin's Q is defined as the market value of assets divided by the replacement value of assets. In addition, the market value of assets is denoted by the sum of the book value of assets and the market value of common outstanding stocks. Then, the sum of the book value of common stock and balance sheet deferred taxes is subtracted. The replacement value of assets is measured by the book value of assets (Bauer, Guenster and Otten, 2004). In this study, Tobin's Q is calculated by using the following formula.

$$Tobin's\ Q = \frac{Market\ value\ of\ equity + Book\ value\ of\ debt}{Book\ value\ of\ total\ assets}$$

Controlling variables used in this study are total assets as a measurement of size (Size), earnings per share (EPS), debt to assets ratio (DAR), natural logarithm of dividend yield (Yield). Return on assets (ROA) and return on equity (ROE) are used as firm accounting performance indicators to examine the robustness of the models. Using natural data taken from each measurement, a standardizing menu in regression analysis to overcome variations among all indicators is applied.

A correlation matrix is used to calculate the correlation among these variables. Following the results of correlation matrix, the influence of some independent variables to dependent variable is examined using multivariate regression analyses in SPSS20. The stepwise method is applied to cautiously control multicollinearity as seen in the correlation matrix. Multicollinearity is common problem in multivariate regressions that involve various proxies in the same analysis. Here the models are applied to test the hypotheses.

Corporate governance = *f (Ownership structure)*

Firm value = *f (Corporate governance)*

Firm value = *f (Ownership structure)*

IV. RESULTS AND DISCUSSION

Summary statistics

For this study, regression analysis is applied to examine the relationship between ownership structure, corporate governance and firm value. Before the analysis, the authors had conducted a review to determine whether some classic assumptions had been fulfilled. The results showed that the heteroskedasticity problem did not exist. The Durbin-Watson statistic was also found to be close to two, meaning that no autocorrelation problem was prevalent in the models. Summary statistics for the firms-year unit analysis are illustrated in table 1.

The table reflects the number of available year-firm unit of analysis, mean, minimum, maximum, and standard deviation of dependent and independent variables. The minimum value of proportion for independent commissioner (IC), institutional and managerial ownership shows a null value, while the minimum board of members (BOD) and audit committee (AC) is one person. The numbers of IC, BOD, and AC indicate the efforts of Indonesian listed companies to comply with corporate governance practices. Institution variable has a higher mean value (65.47 per cent), even the maximum percentage is 100 per cent, compared to the mean of managerial ownership of only 1.36 per cent. It shows a high concentration of ownership held by institutional shareholders in listed companies in Indonesia, although the deviation is also relatively high. The maximum proportion of independent commissioners is 1 per cent, meaning that on average there are 1-2 independent commissioners among 4-5 members of commissioners.

Table 1. Summary statistics

Variables	N	Minimum	Maximum	Mean	Std. deviation
Inst (per cent)	3 148	0	100	65.47	22.831
Mgt (per cent)	3 147	0	74	1.36	6.437
IC (per cent)	3 191	0	1	0.38	0.160
BOD (person)	3 182	1	13	4.52	2.038
AC (person)	3 175	1	11	2.39	1.401
Size (Rp)	3 191	27 408 446	1.E+15	1.65E+13	7.202E+13
TobinsQ (per cent)	3 191	-9	145	1.82	3.814
EPS (Rp)	3 190	-43 857	306 959	523.62	6 559.237
DAR (per cent)	3 191	0	163	0.74	4.042
Yield (per cent)	1 747	0	89	2.59	5.131
ROA (per cent)	3 185	-2 402	2 418	5.82	69.536
ROE (per cent)	3 188	-1 518	4 429	13.93	123.224

Note: Inst: the percentage of institutional shareholding; Mgt: the percentage of managerial shareholding; IC: proportion of independent committee; BOD: the number of board of directors members; AC: the number of audit committee members; Size: firm size, measured by total assets; TobinsQ: Tobin's Q, measured by ratio between market value of equity plus book value of debt to book value of total assets; EPS: earnings per share; DAR: total debt to asset ratio; Yield: dividend yield, ROA: return on assets; ROE: return on equity.

Table 2. Results of regression analyses (dependent variable: corporate governance)

Explanatory variables	t value					
	1.1a	1.1b	1.2a	1.2b	1.3a	1.3b
	IC	IC	BOD	BOD	AC	AC
Institutional	2.823**	–	7.059**	–	-0.784	–
Managerial	–	-2.942**	–	-4.433**	–	-1.079
IC	–	–	–	–	–	–
BOD	–	–	–	–	–	–
AC	–	–	–	–	–	–
Size	–	–	–	–	–	–
EPS	–	–	–	–	–	–
DAR	–	–	–	–	–	–
Yield	–	–	–	–	–	–
F	7.967	8.654	49.824	19.656	0.615	1.164
Adj R sq.	0.002	0.002	0.015	0.006	0.000	0.000
Sig.	0.005**	0.003**	0.000**	0.000**	0.433	0.281

The presence of the multicollinearity problem among the variables linked to firm value and corporate governance by applying correlation matrix is also examined in this study (table 3). Following the recommendation that multicollinearity occurs, if the tolerance level is less than 0.01 and 0.05, Pearson's correlation matrix shows several potential problems, namely between institutional and managerial ownership, and among IC, BOD and AC. Therefore, for this study these variables are not applied in one model simultaneously, but rather they are relied on to deliver different information by applying them in univariate regression analysis, except for models using controlling variables. As a consequence, testing models that analyse the influences of ownership structure to corporate governance variables and corporate governance variables to firm value simultaneously are not applied. Here the formulation of expanded regression models is applied instead.

CG	=	*f (Ownership structure)*	
IC	=	*f (Institutional)*	Model 1.1a
IC	=	*f (Managerial)*	Model 1.1b
BOD	=	*f (Institutional)*	Model 1.2a
BOD	=	*f (Managerial)*	Model 1.2b
AC	=	*f (Institutional)*	Model 1.3a
AC	=	*f (Managerial)*	Model 1.3b

To examine the second hypothesis, IC, BOD and AC are used as the independent variables partially because they are predicted to create firm value (Models 2.1a-c). Next, Models 2.2a-c are applied to examine whether the influences of corporate governance factors are improved when several controlling variables, EPS, DAR and Yield are considered.

Firm value	=	*f (Corporate governance)*	
TobinsQ	=	*f (IC)*	Model 2.1a
TobinsQ	=	*f (BOD)*	Model 2.1b
TobinsQ	=	*f (AC)*	Model 2.1c
TobinsQ	=	*f (IC, Size, EPS, DAR, Yield)*	Model 2.2a
TobinsQ	=	*f (BOD, Size, EPS, DAR, Yield)*	Model 2.2b
TobinsQ	=	*f (AC, Size, EPS, DAR, Yield)*	Model 2.2c

Table 3. Correlation matrix

		Institutional	Managerial	IC	BOD	AC	Size	TobinsQ	EPS	DAR	DivYield	ROA	ROE
Institutional	Pearson Corr.	1											
	Sig. (2-tailed)												
	N	3 148											
Managerial	Pearson Corr.	**-0.261****	1										
	Sig. (2-tailed)	0.000											
	N	3 143	3 147										
IC	Pearson Corr.	**0.048***	-0.000	1									
	Sig. (2-tailed)	0.08	0.994										
	N	3 148	3 147	3 191									
BOD	Pearson Corr.	**0.125****	**-0.079****	**0.076****	1								
	Sig. (2-tailed)	0.000	0.000	0.000									
	N	3 140	3 140	3 182	3 182								
AC	Pearson Corr.	-0.014	-0.019	**0.158****	**0.254****	1							
	Sig. (2-tailed)	0.433	0.281	0.000	0.000								
	N	3 133	3 133	3 175	3 175	3 175							
Size	Pearson Corr.	-0.030	**-0.035***	**0.160****	**0.295****	**0.234****	1						
	Sig. (2-tailed)	0.188	0.022	0.000	0.000	0.000							
	N	3 148	3 147	3 191	3 182	3 175	3 191						
TobinsQ	Pearson Corr.	**-0.065****	**-0.040***	0.016	**-0.042***	**0.052****	**0.046****	1					
	Sig. (2-tailed)	0.000	0.023	0.356	0.017	0.003	0.001						
	N	3 148	3 147	3 191	3 182	3 175	3 191	3 191					
EPS	Pearson Corr.	**0.050****	0.034	**-0.063****	-0.014	**-0.066****	0.004	-0.011	1				
	Sig. (2-tailed)	0.004	0.057	0.000	0.412	0.000	0.821	0.545					
	N	3 147	3 146	3 190	3 181	3 174	3 190	3 190	3 190				
DAR	Pearson Corr.	**-0.067****	-0.016	-0.014	-0.022	-0.016	0.001	-0.006	-0.003	1			
	Sig. (2-tailed)	0.000	0.366	0.279	0.221	0.375	0.889	0.752	0.845				
	N	3 148	3 147	3 191	3 182	3 175	3 191	3 191	3 190	3 191			

Table 3. ***(continued)***

		Institutional	Managerial	IC	BOD	AC	Size	TobinsQ	EPS	DAR	DivYield	ROA	ROE
DivYield	Pearson Corr.	**0.051***	-0.019	0.052*	0.026	0.040	-0.013	**-0.064****	**0.071****	-0.022	1		
	Sig. (2-tailed)	0.033	0.434	0.029	0.278	0.093	0.576	0.007	0.003	0.361			
	N	1 730	1 727	1 747	1 746	1 743	1 747	1 747	1 747	1 747	1 747		
ROA	Pearson Corr.	**0.050****	-0.004	0.000	0.030	0.015	-0.004	-0.008	0.030	**0.102****	0.044	1	
	Sig. (2-tailed)	0.005	0.812	0.981	0.095	0.395	0.827	0.638	0.086	0.000	0.064		
	N	3 142	3 141	3 185	3 176	3 169	3 185	3 185	3 184	3 185	1 745	3 185	
ROE	Pearson Corr.	0.000	-0.008	**-0.039***	0.012	**0.040***	0.011	0.001	**0.042***	-0.011	**0.058***	**0.333****	1
	Sig. (2-tailed)	0.981	0.650	0.029	0.502	0.025	0.542	0.963	0.018	0.533	0.016	0.000	
	N	3 145	3 144	3 188	3 179	3 172	3 188	3 188	3 187	3 188	1 746	3 184	3 188

Note: **Correlation is significant at the 0.01 level (2-tailed). *Correlation is significant at the 0.05 level (2-tailed).

For the third hypothesis, the equations without and with controlling variables are applied. The models are as follow.

TobinsQ	=	*f (Institutional)*	Model 3.1a
TobinsQ	=	*f (Managerial)*	Model 3.1b
TobinsQ	=	*f (Institutional, Size, EPS, DAR, Yield)*	Model 3.2a
TobinsQ	=	*f (Managerial, Size, EPS, DAR, Yield)*	Model 3.2b

Afterwards, accounting-based financial proxies, ROA and ROE are used as the dependent variable to examine the robustness of the results of the third analysis. Therefore, the formulas are as follow.

ROA	=	*f (Institutional)*	Model 4.1a
ROA	=	*f (Managerial)*	Model 4.1b
ROE	=	*f (Institutional, Size, EPS, DAR, Yield)*	Model 4.2a
ROE	=	*f (Managerial, Size, EPS, DAR, Yield)*	Model 4.2b

Following the models, several analyses are conducted. The description then flows in accordance to ownership factors that determine corporate governances. The results of the analysis towards the models are presented in tables 4 and 5.

Findings

The table illustrates that the four first models applied to analyse the influences of institutional and managerial to the corporate governance variables, namely the proportion of IC and the number of BOD, are significant (sig < 0.05). Interestingly, among them, two models that analyse managerial influence on IC and BOD are negatively significant (Models 1.1b and 1.2b), while the institutional factor is positively meaningful (Models 1.1a and 1.2a). Meanwhile, these two ownership factors are not notably providing impacts on AC suggesting that in any circumstance institutional and managerial ownership individually do not affect the number of audit committee (Models 1.3a and 1.3b).

The results of analysing the influences of ownership structure, corporate governance and other controlling variables to firm value are described in table 4. The content indicates that among the three indicators of corporate governance, only two corporate governance measurements, the number of BOD and AC, are affecting Tobin's Q (Models 2.1b-c, and Models 2.2b-c). While BOD has a negative influence,

Table 4. Results of regression analyses (dependent variable: firm value)

Variables	t value									
	2.1a	2.1b	2.1c	2.2a	2.2b	2.2c	3.1a	3.1b	3.2a	3.2b
	TobinsQ	TobinsQ	TobinsQ	TobinsQ	TobinsQ	TobinsQ	TobinsQ	TobinsQ	TobinsQ	TobinsQ
Institutional	–	–	–	–	–	–	-3.651**	–	-3.511**	–
Managerial	–	–	–	–	–	–	–	-2.272*	–	-1.246
IC	0.923	–	–	0.677	–	–	–	–	–	–
BOD	–	-2.381*	–	–	-4.479**	–	–	–	–	–
AC	–	–	2.945**	–	–	2.959**	–	–	–	–
Size	–	–	–	3.509**	5.065**	2.664**	–	–	3.566**	3.632**
EPS	–	–	–	-1.302	-1.286	-0.950	–	–	-1.060	-1.378
DAR	–	–	–	0.274	0.054	0.311	–	–	0.154	0.236
Yield	–	–	–	-2.499*	-2.409*	-2.737**	–	–	-2.362*	-2.545*
F	0.852	5.669	8.671	4.671	8.638	6.393	13.329	5.162	7.002	4.822
Adj R Sq.	0.000	0.002	0.002	0.010	0.021	0.015	0.004	0.001	0.017	0.011
Sig.	0.356	0.017**	0.003**	0.000**	0.000**	0.000**	0.000**	0.023*	0.000**	0.000**

Table 5. Results of regression analyses (dependent variable: financial performance)

Variables	t value			
	4.1a	4.1b	4.2a	4.2b
	ROA	ROA	ROE	ROE
Institutional	2.782**	–	-0.593**	–
Managerial	–	-0.238	–	-0.232
IC	–	–	–	–
BOD	–	–	–	–
AC	–	–	–	–
Size	–	–	0.924	0.939
EPS	–	–	6.824**	6.787
DAR	–	–	-0.600	-0.585
Yield	–	–	1.962	1.932
F	7.739	0.057	10.810	10.738
Adj R Sq.	0.002	0.000	0.028	0.027
Sig.	0.005*	0.812	0.000**	0.000**

AC affects Tobin's Q positively. When comparing Models 2.1a and 2.2a, it is known that IC does not influence Tobin's Q, both individually and when the variable is combined with controlling variables. Model 2.2b implies that BOD has greater influence to Tobin's Q when it is combined with controlling variables influencing Tobin's Q (compare F value Model 2.1b that is 5.669 greater than 8.638 F value in Model 2.2b). Among controlling variables, size and dividend yield have significant influence on Tobin's Q.

In analysing the influence of ownership structure to Tobin's Q, it is found that institutional ownership cannot influence firm value individually (Model 3.1a), while in multivariate analysis with controlling variable, institutional ownership has significant influence (Model 3.2a). Contrarily, the presence of managerial ownership individually has significant and negative influences to firm value (Model 3.1b). However, managerial ownership does not affect the dependent variable when it is analysed together with controlling variables (Model 3.2b). A notable finding is that both measurements of ownership structure have negative impact on firm value. Table 4 also depicts that size and yield as two controlling variables are consistent showing significant impacts to firm value in all models.

Table 5 shows results of robustness analysis on the influences of ownership structure towards firms' financial performance, measured by ROA and ROE. Scholars have applied financial performance differently as compared with firm value, as the former is an accounting-based measurement while the latter is developed from market value of outstanding shares. The findings show that institutional holdings have significant influence on ROA and ROE, while the relationship does not exist for managerial ownership. When the controlling variables are applied, the influence of institutional ownership is less robust and even negative (t value is -0.593 in Model 4.2a, compare to t value 2.782 when the Model 4.1a is univariate analysis). Contrarily, Model 4.2b, which comprises managerial and controlling variables, is proven to be significant to predict ROE.

Discussions

Relationships between ownership structure and corporate governance

The findings suggest that the percentages of institutional and managerial ownerships in Indonesia are statistically significant to influence corporate governance, measured by the proportion of the number of independent commissioners and board of directors. However, these ownership variables do not influence the audit committee. They confirm the view of Bauer, Guenster and Otten (2004) that there is a growing interest from investors concerning the practices of corporate governance within corporations. According to Bauer, Guenster and Otten (2004), institutional investors would like the role of corporate governance of the companies to be included in their investment evaluation policy decisions. The presence of institutional investors is a signal that a company is making efforts to improve the level of governance system. Mollah, Al Farooque and Karim (2012) state that higher institutional ownership is considered to be better monitoring mechanisms of the listed companies. A large percentage of share ownership leads to shareholder activism and it has a significant role to monitor and improve the level of companies' good corporate governance practices. Park and Shin (2004) have found that together with the presence of directors with financial expertise background, institutional shareholders of listed companies in Canada are playing an active role in reducing earnings management. However, in this present study, it had been found that large institutional investors do not influence the establishment of audit committees. In Indonesia, listed companies are required to set up an audit committee to ensure compliance with corporate governance principles, therefore the relationship is not significant.

It should be noted that the coefficient for managerial ownership in all models that relate to corporate governance measurements shows a negative value. This suggests that companies with a higher percentage of managerial ownerships tend to

reduce the proportion of independent commissioners and board of directors and audit committees. In most large corporations owned and controlled by institutions and conglomeration, the existence of and suggestions to raise managerial ownership tends to conflict with corporate governance practices. Synchronizing major and managerial shareholders by increasing the managerial ownership does not likely seem to occur in Indonesia in the near future. Managerial ownership specifically does not appear to be significant in determining the presence of an audit committee. As Indonesian companies apply a two-tiered system, this result may suggest that the presence of managerial ownership may complement or partly substitute the role of audit committee to manage oversight tasks. Indeed, this assumption needs to be confirmed by further research.

It has been found that institutional and managerial ownerships do not statistically have a significant influence on the establishment of an audit committee, implying that the listed companies on the Indonesia Stock Exchange comply with the requirement to establish an audit committee irrespective of the company's ownership structure. In fact, under the Indonesian Corporate Governance Code, it is recommended that all listed companies establish several board committees, including an audit committee (International Finance Corporation, 2014).

Relationship between corporate governance and firm value

The results of the study indicate that two measurements for corporate governance, BOD and AC, are significantly determining Tobin's Q both with and without controlling variables, while the presence of IC does not affect the dependent variable. Related to BOD, these results challenge the findings of Mollah, Al Farooque and Karim (2012), which find it to be positive but insignificant. Conversely, the current research shows the significant and negative influence of BOD to Tobin's Q. It implies that the higher number of BOD, the lesser achievement of Tobin's Q. As a measurement of hybrid performance, combined accounting- and market-based performance, Tobin's Q represents investors' appreciation to firm performance. A higher number of BOD membership would cause inefficiency, which becomes cost-consuming and decreases financial performance.

Under the Indonesian Code of Good Corporate Governance, BOD should comprise members, who enable to make effective, right and timely decisions and to act independently. The members must also have integrity, experience and help the company achieve profitability and ensure sustainability. The members of BOD are also required to gain an understanding of and implement the good corporate governance code. As this study finds that the number of BOD significantly and negatively affects Tobin's Q, it implies that the markets presume the number is not in

accordance with firm value. This study leaves open for inquiry what level of BOD membership satisfies the markets for further studies.

The Good Corporate Governance Code indicates that all companies, represented by BOD, attain transparency, accountability, responsibility, independency, and fairness by also considering stakeholders' interests. In terms of complying with transparency and accountability, under the Code, listed companies are required to prepare and ensure sound communication between the company and its stakeholders. Company information must be available and accessible to stakeholders in line with the need of stakeholders. The number of BOD as the proxy in this study does not seem to be adequate to cover an inquiry whether BOD is performing well and accomplishing their duties. A comparison of the results of significant associations between BOD and Tobin's Q (that has a negative sign) and AC to Tobin's Q (that has positive sign), however, shows that the markets positively appreciate the numbers of AC than BOD.

Under the Code, all listed companies on the Indonesia Stock Exchange must prepare an annual report on implementing good corporate governance. The report should include work guidelines for BOD and commissioners, an applicable code of conduct, the functions of risk management and internal audit. Subsequently, there are some further requirements. BOD of companies in the financial sector must add information about the results of a self-assessment regarding their achievements, while managements of State-owned enterprises must provide the results of assessments undertaken by the Financial and Development Supervisory Bodies and the follow-up actions taken. Considering the results of this study, the markets do not appear to be reacting to the information that BOD is practicing the principles, while they respond more to the AC activities. This finding suggests that the Government of Indonesia should support the establishment of an independent body to assess and rank the accomplishments of corporate governance principles in public (and later private) Indonesian companies. Self-assessment does not appear to be satisfactory to the markets as it tends to be normative and subject to window dressing.

The presence of AC leads to an increase in Tobin's Q, implying that investors in the market respond positively to the presence of an appropriate audit committee. This is similar to the findings of Mollah, Al Farooque and Karim (2012) and Chan and Li (2008) that the audit committee plays a vital role as a corporate governance mechanism that influences a firms' performance. International Finance Corporation (2014) states that the audit committee is the most important committee in terms of representing shareholders' interests. As Tobin's Q is calculated based on market value, it seems that investors in Indonesia are comfortable with AC. Corporate governance principles require companies to set up an audit committee with an

appropriate number of members and that the members have the necessary financial background. The combined results from testing Models 1.3a-b, 2.1c and 2.2c shed light on the current information that investors have comprehended the important role of the audit committee in propagating principles of good governance, regardless of the ownership structure in Indonesia. AC represents a direct connection with external and internal auditors who are believed to be more independent than other departments of the firm. The greater number of member on AC, up to the certain level, will lead to an increase in the firm value. Of course, the higher number of AC membership could result inefficiency and lead to decline in firm value. This study leaves the determination of appropriate number of members for further research.

The results of testing Models 2.1a and 2.2a show that the percentage of independent commissioners does not influence the value of the firm. In the Indonesian Code of Good Corporate Governance, it is stated that the Board of Commissioners may consist of some independent commissioners. The independent commissioners are evaluated and appointed prior to the general meeting of shareholders by the nomination and remuneration committee, by considering the opinion of minority shareholders. However, appointing independent commissioners through this meeting in firms in which institutional shareholders are dominant may compromise the independence of the commissioners.

Next, in carrying financial audit activities, board of commissioners could be assisted by an audit committee that is chaired by an independent commissioner. Considering this composition, the findings reflect that in the case of Indonesia, investors do not consider the presence of independent commissioners when establishing good corporate governance, but rely on the audit committee instead. The requirements stated in the Indonesian Code of Good Corporate Governance may explain this result. First, the Code obliges public companies, State-owned enterprises, companies that raise and manage public funds and companies with extensive influence on environment to establish an independent audit committee. Otherwise, the Indonesian Financial Service Authority, the government body that authorizes the compliances of public companies, can enact sanctions on them. The sanctions may be in the form of a warning, penalty fee, businesses termination or withdrawal of business licences. Second, one function of the audit committee is to ensure that financial reports are presented appropriately in accordance with generally accepted accounting principles. To accomplish its functions, the members of the audit committee must have a financial academic and work experience background, which is acceptable to the general public. The audit committee's influence is more significant as it considers the appointment of an external auditor, who verifies transparency and the accountability of companies' annual reports. In this context, the finding suggests that the presence of an audit committee replaces the role of institutional commissioner

alone to increase positive appreciation of investors about practices of corporate governances in the firms.

Regarding the relationship between independent commissioners and firm value, Morck, Shleifer and Vishny (1988) stated that outside board members played an important role in overseeing the managers' performances. The monitoring task was difficult because outside members did not have a personal interest in the firm or control over a large block of votes. They were more reluctant to site poor corporate decisions. Therefore, firm value increased in line with a sufficient proportion of independent commissioners. However, this study shows different results, namely that the presence of independent commissioners in companies listed on the Indonesia Stock Exchange does not affect Tobin's Q. Morck, Shleifer and Vishny (1988) noted this finding and stated that outside board members did not do this function adequately as they often were puppets of top officers.

Among corporate governance measurements, the existence of an audit committee is important to ensure good governance practices, which are seen as essential by important investors (see Model 2.1c). Interestingly, when the audit committee is set as an explanatory variable together with control variables, its role remains the same (Model 2.2c). Both analyses show that the market positively appreciates the presence of audit committee. The results also imply that investors should focus not only the composition of board of directors, but they should also consider EPS and Yield.

Relationship between ownership structure and firm value

Examining the relationships between ownership structure measurements with firm value (Models 3.1a-b and 3.2a-b), in this study it has been found that institutional ownership adversely and significantly affects Tobin's Q, both when the control variables are included or not in multivariate testing. Controlling variables are size, EPS, DAR, and dividend yield. Meanwhile, managerial ownership is significant to determine Tobin's Q only in univariate testing without control variables in the model. Models 3.2a-b show that two controlling variables, size of the firms and dividend yields, are other significant factors that determine firms' value.

It is interesting that in the case of Indonesia, institutional ownership negatively affects firm value as measured by Tobin's Q, meaning that a high percentage of institutional shareowners would decrease the firm value. Investors in the Indonesia Stock Exchange apparently do not positive respond to a high concentrated institutional ownership. This finding is different than those of McConnell and Servaes (1990), Lins (2003), Abdallah and Ismail (2017), which find a significant positive association between Tobin's Q and the percentage of ownership of institutional

investors. Agency theory explains that large shareholders provide an efficient monitoring scheme that leads to a better performance. Abdallah and Ismail (2017) explain that the results of scrutinizing this relationship may vary because a highly concentrated ownership could result in too much interference with management decisions, which, in turn, may hurt the firm's financial performance. A positive relationship between these measurements are possible because of the ability of a highly concentrated ownership to replace weak governance and monitor the managers' action, which then positively affects the financial performance. Instead, this study supports the view taken by Baek, Kang and Park (2004) that a higher ownership concentration leads to a decrease in firm value.

In testing the relationship between managerial ownership and firm value, the results do not support the convergence-of-interest hypothesis that synchronizing managers' interest with outside shareholders' leads to a higher market valuation of the corporation. Convergence-of-interest proposes that when managers hold substantial equity in the firm, and other shareholders are too dispersed to impose value maximization, corporate assets may be deployed to benefit the managers. As managers' interests are similar to outside shareholders, the costs of deviation from value-maximization decline. As a consequence, market value increases along with the growing number of management ownership (Morck, Shleifer and Vishny, 1988). Following the findings, however, the convergence-of-interest hypothesis is not working to explain how to improve firm value through enhancing the role of managerial ownership in Indonesia. Companies in Indonesia, on average, have a low percentage of managerial ownership and high concentration of ownership by institution. Apparently, the current percentages of ownership held by managers are not sufficient to allow the managers take control of the firms' assets and to gain benefits as expected.

Another interesting finding is that institutional ownership affects firm value along with controlling the size and dividend yield. While size has a positive impact, dividend yield has a negative impact on firm value. Findings related to size of the sample are in line with Morck, Shleifer and Vishny (1988), who have also found that the contribution of size is associated with board ownership and market value. The significance of size and dividend yield in Models 3.2a-b shows that the negative relationship between institutional ownership and Tobin's Q is not merely the consequence of negligible or a low percentage of managerial shareholding. Ample reliance on institutional owners to monitor management activities is detrimental to the value of a firm in accordance with the increasing size and the decreasing dividend yield of the firm. The results also prove that leverage and earnings per share do not affect firm value.

To provide robustness to the analysis, the analysis of ownership data and how they relate to the accounting-based firm performance is repeated. Two indicators of firm accounting performance are ROA and ROE. It has been found that institutional ownership has significant influence to ROA positively and ROE negatively, while managerial ownership does not significantly affect ROA and ROE. This implies that institutional ownership in Indonesia has an adequate control mechanism to positively improve return on asset. Combined with positive results between institutional ownership and corporate governance, the institutional investors are able to develop an appropriate monitoring system and then increase return on asset. The negative relationship between institutional ownership and ROE, and lack of relations between managerial ownership and firm accounting performance show that investors do not appreciate high institutional and low percentage of managerial shareholdings. An additional study is required to determine to what extent institutional ownership is able to increase ROE and contrarily, higher percentage of managerial shareholding is sufficient to improve ROA and ROE in Indonesia, as studied by Abdallah and Ismail (2017).

V. CONCLUSION

In the present paper, the relationships between ownership structure, corporate governance and firm value of companies listed on the Indonesia Stock Exchange during the period 2009-2016 are examined. Comprising 425 listed companies and applying standardized regression analysis, the results of this study show that the percentages of institutional and managerial ownership are significant in determining corporate governance measured by the proportion of independent commissioners and the number on members on the board of directors. The existence of large institutional investors represents a better monitoring mechanism, although suggestions to raise the level of managerial ownership tend to conflict with current corporate governance practices. Both institutional and managerial ownership do not affect the presence of an audit committee, as the establishment of this committee is obligatory according to Indonesia Corporate Governance Principles.

The second relationship studied is between corporate governance and firm value. The results show that two measurements of corporate governance, board of directors and the audit committee, are significant in determining the firm value, while an independent commissioner is not meaningful. This implies that investors in Indonesia shun inefficient boards of directors but are secure with the appropriate number of audit committee members. The insignificant relationship between independent commissioners to firm value is probably because of a lack of trust by the general public about the independency of the appointed person.

In testing the third hypothesis, the results show that ownership structure measurements are significant and negatively influence firm value with controlling variables. This implies that investors in the Indonesia Stock Exchange do respond positively to a high concentration of institutional ownership. On the other hand, managerial ownership is not proven to be significant to contribute to efforts to increase a firms' value.

Including controlling variables in the hypothesis testing, this research indicates that size and dividend yield have a significant impact on firm value. Apparently, when the company has large institutional owners that set tight control mechanism on the management, the practices are disadvantageous to firm value, which is the same for increasing the size and decreasing the dividend yield of the firm. The results also prove that leverage and earnings per share do not affect firm value. Using return on assets and return on equity as dependent variables of ownerships structure shows that institutional ownership has an adequate control mechanism to improve return on assets. Further research is required to examine to what extent institutional ownership is needed to increase return on equity, and managerial shareholding is able to improve return on assets and return on equity in Indonesia.

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ANNEX

Concepts	Proxies	Definition
Firm performance	Tobin's Q (TobinsQ)	Market value to book value of the firm
Ownership variables	Institutional shareholdings (Institutional)	Percentage of shares held by institutions
	Managerial shareholdings (Management)	Percentage of shares held by managers
Corporate governance variables	Independent commissioners (IC)	Proportion of independent commissioners
	Board of directors (BOD)	Number of members of board of directors
	Audit committee (AC)	Number of audit committee
Controlling variables	Earnings per share (EPS)	Earnings after tax/number of outstanding shares
	Debt to asset ratio (DAR)	Total debt/total asset
	Dividend yield (Yield)	
	Return on assets (ROA)	Net profit/total assets
	Return on equity (ROE)	Net profit/shareholders' equity

INFORMATION TECHNOLOGY EXPORTS AND REGIONAL DEVELOPMENT IN THE LEADING STATES: A SHIFT-SHARE ANALYSIS OF INDIA

*Girija V. Nachnani and A.M. Swaminathan**

India has adopted a balanced growth strategy driven by its large internal market, which entails making a major commitment to the endogenous development model. Previously, the country's development plans were built around the supply-side and import substitution approach. In the early 1980s, the economy of India experienced structural changes, as the gross domestic product growth rate steadily increased, and then in the early 1990s, the country leapfrogged into a development policy centred on information technology, which led to the development of a globally competitive information technology (IT) sector. IT has helped states in India to develop through intersectoral linkages with several services and the multiplier effect. This makes it interesting to review the impact of growth of IT on development in states where IT development is prominent. As states have not been equal beneficiaries, a shift-share analysis was carried out to arrive at these imbalances for the period 2004/05-2008/09 and 2009/10-2013/14. The results of a shift in the share show that regional variations in software exports can largely be attributed to a regional component. In addition, the results of ordinary least squares estimation point out that existing infrastructure is overstressed, namely that there is excessive pressure on teledensity, a shortage of power and a large population, which is making it difficult for regions to sustain a high level of specialization.

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I. INTRODUCTION

The major theoretical concepts and planning applications from the mid-twentieth century originated from Rostow (1960), who dealt with a five-stage model of economic development, Perroux (1950), who pioneered the growth pole theory, and Hirschman (1958), who focused on balanced verses unbalanced growth, and in the 1970's, the East Asia export promotion model. About that time, the neoclassical growth theory emphasized that growth and development were largely a function of labour and capital factor price differentials, that is, comparative advantage among countries and/or regions. Later, Solow (1959) showed that factor price differentials account for only about 50 per cent of the variance in economic growth, while the other 50 per cent was because of technological change. However, in the mid-1980s, the "New Growth Theory", as it is now called, focused on endogenous factors, that is, local conditions, such as leadership, labour force characteristics, innovation patterns and institutional capacity. Throughout that time, supply side or hard infrastructure, including social overhead investment in human capital (education and training), was the primary focus.

Contrary to those prevailing models, India implemented a different course of action. It adopted a balanced growth strategy driven by the country's large internal market. In contemporary terms, this was a very large commitment to an endogenous model for its development strategy. For the first 40 years, the five-year development plans were built around a largely supply-side and import substitution approach. During that period, the economy went through changes with the gross domestic product (GDP) growth rate steadily increasing from an average of 3.5 per cent per year during the first three decades of planning (1950 to 1980) to 5.4 per cent during the 1980s.

The reforms in the 1990 have led to positive growth results. The country's GDP increased from 5.7 per cent during the 1990s to slightly little less than 8 per cent during the 2000s. Its average annual rate of real per capita income growth also increased from about 1.3 per cent in the 1960s and 1970s to about 3.6 per cent in the 1990s and 5.9 per cent in the 2000s (India, Planning Commission, 2013).

During the early 1990s, India leapfrogged in a significant way into IT-oriented economic development (although the origins of this industry can be traced to the mid-1980s). It developed a globally competitive information technology (IT) services

industry, which has continued to grow. The generic term "information technology" sector broadly consists of three segments: (a) IT software: software customization, such as coding and testing, IT consulting, system integration, network infrastructure management and product development; (b) business process management, which covers back office jobs, starting from low-end functions, such as call centres and routine data processing, to more knowledge-intensive applications related to, for example, engineering design, multimedia and graphics, medical and legal transcriptions, insurance claim processing and inventory management; and (c) IT hardware, such as assembling of computers and peripherals.

The key verticals of the IT industry, namely banking, financial services and insurance, telecom, government, manufacturing, education and health care, are driving growth across sectors. Research studies by Arora and Athreye (2002), Kumar (2005) and Chatterji (2013) reviewed the potential of the IT industry as a tool for development. IT has been instrumental in supporting the development of different states in India, but not all states in the country have benefited from it. As IT is directly related to trade and communication and indirectly related to a number of sectors, including among them, transportation, banking and insurance, the development of the IT sector clearly leads to the development of related sectors, such as travel, tourism, real-estate, education and e-governance. This, in turn, benefits the local community and business through the generation of additional economic opportunities, jobs and incomes. Therefore, the present study is aimed at studying the impact of the growth of the IT sector on the regional development in different states. Using a shift-share analysis for two periods, 2004/05 to 2008/09 and 2009/10 to 2013/14, for the top ten IT-exporting states, and with the results of the shift-share analysis using the ordinary least squares method, the study looks into the imbalances stemming from the impact of IT and the causes behind them. Thus, this study provides a picture of regional development in these areas. The results of shift-share analysis show that regional variations in software exports were largely due to the regional component. The examination of industry mix shows that in such states as Karnataka, Tamil Nadu and Uttar Pradesh, an increase in export earnings occurred because of a favourable industry mix. The results on ordinary least square estimation indicates that the existing infrastructure is overstressed, namely that there is excessive pressure on teledensity and a shortage of power and that the high population makes it difficult for regions to sustain a high level of specialization.

In the remainder of this study, section II consists of a literature review, section III provides a discussion on the approach to the study, section IV deals with the methodology and section V covers the database. Empirical results and analysis is dealt with in section VI and section VII contains a discussion on the policy implications. Section VIII concludes the paper.

II. REVIEW OF LITERATURE

The literature review deals with studies that have improved the shift-share analysis theoretically and some with empirical applications. Estaban-Marquillas (1972), Arcelus (1984), and Casler (1989) dealt with theoretical improvement of the shift-share analysis. Haynes and Dinc (1997), Liu, Yao and Zhang (1999), and Randall (1973) dealt with empirical application of shift-share analysis.

Estaban-Marquillas (1972) introduced a new concept of the allocation effect to better understand the competitive effect under shift-share analysis. Arcelus (1984) introduced the concept of allocation effect to accommodate the degree of specialization in a region. Casler (1989) tried to deflect the criticism of shift-share analysis by developing a labour demand model within regions, which is consistent with the theory behind the model. Using the concept of unbalanced growth and certain assumptions, he found that his model was adapted to correspond to shift-share formulation, which, in turn, made the assumptions underlying shift-share analysis obvious and clarified the economic interpretations and analysis of the shift-share effects. He also showed that by slightly modifying the model, the linkage effect between various industries and regions and the national economy could be specified. Using theoretical arguments, he arrived at the conclusion that "arguments against definitions within theory are far more tenuous where these definitions aid in achieving stated research goals". Continuing with the theoretical arguments, he managed to come up with the formation of models from which both spatial and a spatial economics can be integrated and the balanced growth framework or linkage framework can be predicted.

Haynes and Dinc (1997) studied the growth in output and looked into the change in productivity on employment while extending the analysis of shift-share analysis. The authors tried to separate the effects of changes in output and productivity by modifying the Rigby-Anderson extension. Here the contribution of labour and capital to productivity growth were separated for analysing the regional economic performance. They assessed whether the observed changes in employment were because of changes in output or in productivity by using twenty manufacturing sectors at the two-digit level, in twelve states of the United States of America. The results showed that in both, the regions changed during the investigation period because of output growth, new investment in physical capital and improvement in technology. The authors are of the view that the crucial role of labour productivity in employment change cannot be ignored.

Randall (1973), in his empirical study based on the shift-share model analysis on employment change in West Central Scotland for the period 1959-1968, found that if the differential decline could be attributed to one or two establishments that was

manufacturing a distinctive product or targeting a particular market, the negative differential component reflected general factors applicable to most firms in the region. With access to disaggregated data one could have attributed this to structural factors. The author highlighted that another important criticism of shift-share analysis was its failure to take into account intersectoral linkages within the regional economy. A negative differential component can be attributed to linkages to declining specific industries and therefore was a concealed structural effect. However, in the absence of regional input-output data, testing those arguments was difficult. Finally, the author pointed out that despite those limitations, the usefulness of the technique should not be discredited. From the policymaking point of view, it was necessary to provide valid generalizations that could form the basis of policy measures.

Liu, Yao and Zhang (1999) carried out an empirical study on economic growth and structural changes in employment and investment in China. The authors analyses the impact of the multitier and multistage development strategy of former Chinese leader Deng Xiaoping on economic growth in Chinese regions in terms of GDP, employment and investment for a ten-year period covering 1985-1994 using a basic shift-share model. The two objectives of the strategy of Deng was to create a few rapidly growing centres, which would serve as a model for the rest of the country to follow. The authors made use of the Randall (1973) concept of net relative change, the difference between actual change and the national component, which is regarded as an index of relative performance of regions.

After reviewing literature on industry clusters, it appears that the importance of industrial "clustering" in space has long been recognized by regional scientists and economists, such as Marshall and Marshall (1920), Hoover (1948), Isard, (1956), Porter (1998), Lundequist and Power (2002), Stimson, Stough and Roberts (2006). The influential book *Competitive Advantage of Nations,* which was written by Michael Porter in 1990, is considered to have triggered the current intense policy interest in industry clusters. Perhaps the reason why this discussion on clustering resonates so strongly with policymakers is that it echoes much of the literature that preceded it and it analyses the linkages between business organization, strategy, and location (with the help of the diamond model) in a lucid manner.

Much of the recent debate recognizes industry clusters as an agglomeration of competing and collaborating industries in a region involving strong interplay between firms and their stakeholders, willingness of the members to share and nurture key technologies and business knowledge, which drives innovation based on locally embedded collective skills of the people and policy interventions. Reviews have also indicated that the proximity of firms and institutions in one location leads to better coordination and trust. Authors have emphasized that knowledge-based elements are the key determinants of the strength of a cluster. The higher the degree of knowledge

integration among firms leads to increased competitiveness among member firms globally and the greater economic performance of the industrial clusters. Although governments play a crucial role in the initial development of an industry, the ongoing inflow of talent, technology and capital have an accelerated effect on the development of industrial clusters. In addition, because industry clusters are built around core export-oriented firms, they bring new wealth into the region and help drive the region's economic growth.

In a review of the IT industries in India, studies by Basrur and Chawla (1999) pointed out that in the 1980's advanced countries were experiencing a "software crisis" in terms of demand for software services rising more rapidly than its supply. This triggered the globalization of production. During that time, India made a successful entry into the global software industry based on its comparatively low cost of professional technical manpower. The extensive use of English as a second language gave India a further competitive advantage in trading its software services with the advanced industrial economies. Initially, the majority of the firms in the country's software industry acted as body shoppers, but gradually in the 1990s a few pioneering Indian firms, such as Tata Consultancy Services, were able to leverage their technical and project management skills to successfully complete turnkey projects for large corporations.

During the 1990s, based on inputs from the industry body, the National Association of Software and Services, which was founded in 1988, the government began to support the industry proactively. First, the establishment in 1990 of the software technology parks provided high speed data communication facilities and financial incentives to firms to provide offshore services. Second, the economic reforms of 1991 induced a major shift in economic policies, including the devaluation of the Indian rupee, trade liberalization and openness to foreign investment. Tariffs and other taxes that had been plaguing the industry were reduced. In addition, in the 1990s IBM returned to India, which sent a positive signal to other global majors that the country's IT industry was set to be a significant player. Third, the telecom sector was deregulated in the mid-1990s, which facilitated participation from the private sector and multinational corporations. A subsequent review of policies has encouraged the rapid adoption of new technologies, allowing the industry to reap the benefits of free market competition, improved service quality and declining tariffs. Along with this, several new IT firms were started. During that decade, TCS, Infosys, and Wipro also emerged as market leaders (KPMG and CII, 2012).

In mid-1990s the IT enabled services/business process outsourcing/business process management industry emerged in India. The industry initially specialized in voice-led work. However, many of business process management services that could be performed remotely, such as customer care, payment services, administration,

human resources, finance and content development, were developed and continued to expand.

Indian business process management players have quickly broadened and deepened the services they offer, which range from data entry and medical transcription to niche areas and expert knowledge services, such as those in legal, pharmaceutical marketing, research (equity and financial) and analytics and drafting patent documents, in order to remain the world's premier destination for backoffice services.

The business process management industry has had as a social impact, as noted by, for example, Business World and the BPO Industry Report, in terms of its large-scale employment of the educated workforce (graduates and undergraduates) from all areas of concentration. A job in a business process outsourcing does not require an illustrious academic record and professional qualifications, but instead more weight is placed on soft skills, such as language proficiency, adaptability and learning ability. Women recruits also constitute 40 per cent of its workforce. The industries' most visible social impact has been its multiplier effects or spillover effects in terms of jobs created for other industries, such as human resources services, catering, transport, telecom equipment, real estate, IT services and office equipment. The business process outsourcing industry has economically empowered young adults and their high disposable income has led to an increase in the demand for costly consumer durables. The industry has created a burgeoning demand for real estate for office and housing space. This in turn has increased demand for, among others, real estate consultants, architects, builders, engineers, security agencies and landscaping professionals. The business process outsourcing has fueled demand for small vehicles, such as cars and vans, as well as for drivers. These vehicles are plying 24/7/365. The industry has also boosted the airline industry with movement of business process outsourcing professionals initially for business purposes and later for leisure. This has indirectly given a boost to the tourism industry. A large expatriate population is now living in such cities as Bangalore, Chennai, Delhi and Mumbai.

The industry has surged ahead and grown by leaps and bounds starting in 2000. The firms in India offering IT services[1] have evolved from providing application development and maintenance to emerge as full-service players that provide testing services, infrastructure services, consulting and system integration. Within those operations, IT outsourcing has grown rapidly in the following segments: remote

[1] Indian IT services are categorized into: (a) project based: IT consulting, systems integration; custom application development; network consulting and integration; and software testing; (b) outsourcing: application management; information system outsourcing; service oriented architecture (SOA) and web services; and (c) support and training.

infrastructure management; application management; and testing and service oriented architecture (NASSCOM, 2010). The industry's vertical market mix[2] is well balanced across several mature and emerging sectors. In 2013 mature outsourcing verticals-banking financial services and insurance, telecom and manufacturing contributed more than 75 per cent of the country's exports in terms of value (NASSCOM, 2013). To sustain its growth and take it to the next level, the country's IT business process management companies have recalibrated their strategies and shifted their focus from cost competitiveness (current linear model) to providing increased value in terms of domain expertise and being more efficient by adopting a non-linear growth model. The levers of this model are: intellectual property; cloud computing; platform business process outsourcing; non-linear pricing models; delivery accelerators; branding; and mergers and acquisitions. Notably, however, the effect of some of the levers are disruptive, such as cloud products and mergers and acquisition, and other could be incremental, such as pricing models and branding (KPMG and CII, 2012).

In addition, a review of studies on IT clusters in India by Van Dijk (2003), Vijayabasker and Krishnaswamy (2004), Ramachandran and Ray (2005), Sawhney (2006), Kumar (2005), Chandrasekhar (2005), Basant (2006), Balatchandirane (2007), Khomiakova (2007) and Chatterji (2013) shows that there has been a concerted effort to study the IT industry in India through the prism of regional cluster development. The researchers analysed IT clusters around the following key metropolitan regions: Mumbai, Bangalore, Hyderabad, Chennai, Kolkata, Delhi, Gurgaon, Noida and Pune. They asserted that globalization was behind the impressive growth of the IT sector and the expansion of the sector put it in a favourable light among the administrative and political elite of India. They point out that success of the sector has been supported by a combination of factors, including among them, the large pool of science, mathematics and engineering graduates, software firms having ISO 9000, six sigma, SEI[3] CMM,[4] SEI CMMI, PCMM[5]

[2] Vertical wise breakup for the year 2013 BFSI (41 per cent); telecom (18 per cent); manufacturing (16 per cent); retail (10 per cent); health care (5 per cent); travel and transport (3 per cent); construction and utilities (2 per cent); media, publishing and entertainment (2 per cent); and others (2 per cent).

[3] SEI CMM: Software Engineering Institute, Capability Maturity Model of the United States (SEI-CMM) certification at level 5.

[4] The purpose of Capability Maturity Model Integration (CMMI) is to guide organizations in their efforts to improve processes and enhance their ability to manage the development, acquisition, and maintenance of products and services. CMMI places proven practices into a structure and helps organizations assess their maturity and process area capabilities, establish priorities for improvement and implement these improvements.

[5] People CMM or PCMM is a process targeted at managing and developing an organization's workforce. The maturity framework of CMM for software. The aim of PCMM is to radically improve the ability of software organizations to attract, develop, motivate, organize and retain the personnel needed to continuously improve an organization's staff to develop effective teams and successfully manage the human resources of an organization.

certification, an early bird advantage, diaspora, expertise, entrepreneurial dynamism and government support. The formation of IT clusters and the benefits in the form of locational economies have not only made the IT industry globally competitive but it also has had a positive impact on the local economy in the form of large tax collection and job creation in diverse sectors, such as transportation, hospitality and consumer durables, and in spinoffs, such as hardware, electrical products, instrumentation, embedded systems, new start-ups and the biotechnology industry. The expanding IT sector has resulted in an increase in demand for office space, premium residential townships, hotels, shopping malls, educational institutions and specialty hospitals. The sector has been a crucial driving force behind the spatial expansion of major cities in India. Furthermore, as metropolitan areas are attracting IT investments and jobs are being created, pressure is being put on infrastructure, real estate costs are escalating, new socioeconomic conflicts are brewing with local residents over land and livelihood issues and demand for IT professionals is increasing. These are among the challenges the IT industry must deal with to gain momentum for further growth. Although the states of India are operating within the same national level macroeconomic environment, there are substantial variations in regional economic development outcomes. This can be attributed to differences among civil society and local- and state-level political and economic cultures and institutions.

III. APPROACH TO THE STUDY

The IT business process management sector has registered tremendous growth over the past 15 years, achieving an iconic status around the world and a reputation for its reliable and cost-effective delivery of services. India is recognized as the outsourcing destination of choice in the world. The major developed markets are sourcing IT business processing management services from India to improve their competitive edge. Indian IT companies have set up more than 600 delivery centres around the world and are providing services in more than 200 cities across 78 countries. As a proportion of national GDP, the sector revenue has increased from 1.2 per cent in fiscal year 1997/98 to nearly 9.5 per cent in fiscal year 2014/15. Its IT business process management revenue is projected to reach $150 billion, with $98 billion from exports and $48 billion from the domestic market. Exports account for a 67 per cent share of the revenue. E-commerce is driving the rapid growth of the domestic IT business process management sector. The domestic market is expected to get a further boost from the Government's focus on "Digital India" and "Make in India". India continues to maintain a leadership position in the global sourcing arena, accounting for almost 55 per cent of the global sourcing market size in 2015, as compared to 52 per cent in 2012 (NASSCOM, 2015).

The total employment associated with IT software and services was estimated to be 3.5 million in 2015. The indirect and induced employment attributed by the sector is estimated at about 10 million. Indirect employment is generated in several ancillary industries, such as those related to telecom, power, construction, transportation, corporate real estate, residential townships, shopping malls, specialty hospitals, catering, security and housekeeping. Induced employment is being driven by consumption expenditure of employees on food, clothing, recreation, and consumer durables including automobiles, health and other services.

The Indian IT business process management industry has emerged as one of the most dynamic sectors in the economic development of India and is responsible for the global recognition of India as a "soft" power. In addition to fueling the economy, the IT business process management industry has been influencing the lives of the people through active direct and indirect contributions to various socioeconomic parameters, such as employment, standard of living and diversity. The IT industry in India is centred on a few clusters to reap the benefits of agglomeration economies. The clusters in Bangalore, Mumbai, Delhi along with its suburbs, Noida and Gurgaon, Hyderabad, Chennai, Pune and Kolkata have helped to spur the emergence of a globally competitive IT industry. Other cities, such as Thiruvananthapuram and Ahmedabad, are in the process of becoming up as popular locations for clusters (Khomiakova, 2007). The spillover of the software industry for balanced regional development hinges on the availability of skilled labour, high speed data communication links and built-up floor space. Research studies, such as that of Surie (2005), point out that the success of the software industry depends on whether the benefits of IT are accessible to a wider population. To bridge the digital divide and to support the diffusion of IT to improve productivity, the state has to play a more proactive role. These observations have prompted the authors of this study to investigate the extent to which the IT sector is contributing to regional development in the ten states and the extent of imbalances, if any. To examine the above, the shift-share method was used. This method is a popular tool for analysing regional growth or decline over time. It has been widely used since the 1960s to assess a region's overall performance relative to other regions by focusing on output, employment and investment by industry sector. The method was introduced in Dunn (1960) and Ashby (1968) and has been extensively discussed in Casler (1989) and Randall (1973). A recent discussion and application of the method is found in Stimson, Stough and Roberts (2006) and Liu, Yao and Zhang (1999). In addition, to analyse the causes behind the states strength/weakness, the study uses an endogenous growth model solved by using the ordinary least squares method. Added to this, the present study also tries to analyse the extent to which per capita income of a state and its IT exports are causing one another in three main states mainly Karnataka, Andhra Pradesh and Tamil Nadu by using the Granger causality test.

IV. METHODOLOGY

The study mainly uses two methods: a shift-share analysis; and econometrics – ordinary least squares estimation and Granger causality test.

Method I: Shift-share analysis

The shift-share method is a technique that uses a sectoral decomposition to examine the regional growth/decline. The method makes it possible to assess the overall performance of a region relative to others. In addition, the method also allows for an assessment of the relative importance of an industry sector in the region and helps to identify industrial sectoral problems in a region. Particularly, this method is used to demonstrate how the industry structure could affect regional and local economies and thereby help in reviewing regional trends and advising policymakers on targets to industries.

The variable decomposed using this method could be, for example, income, employment, value added and number of establishments (Haynes and Dinc, 1997). Thus, the shift-share model decomposes, for example, regional growth/decline of GDP, investment, and employment into three components while measuring them. These relate to:

- National share:[6] by national share, the measure tries to explain that portion of the GDP/exports/employment, change attributable to national trends
- Industry mix:[7] by industry share, the measure tries to explain that portion of the GDP/exports/employment, change attributable to industrial composition or mix of the region, and
- Regional shift:[8] that portion of the GDP/exports/employment, change that is related to the regional advantage or competitiveness in the region is considered as the regional shift component.

[6] Measures the change (growth or decline) in total GDP/exports/employment of an industry at the national level.

[7] Measures the industry composition of the region, namely to what extent the region specializes in industries that are growing rapidly or slowly nationally.

[8] Measures the change in a particular regional industry's GDP/exports/employment, namely growth or decline in a regional industry because locational advantages and disadvantages.

Literature reviews that supported the earlier models using shift-share analysis were those of Perloff and Wingol (1961) and Dunn (1960). The former is said to have focused on total regional employment, which had only two components. These relate to total shift and differential shift. The total shift is expressed as:

$$TS \equiv \sum i\ ei,\ t - \sum i\ ei,\ t - 1\ (\frac{Et}{Et-1}) \tag{1}$$

and the differential shift is expressed as

$$DS \equiv \sum i\ ei,\ t - 1\ \left(\frac{ei,\ t}{ei,\ t-1} - \frac{Ei,\ t}{Ei,\ t-1}\right) \tag{2}$$

Here while *e* refers to the regional employment, *E* refers to national employment. The subscript i refers to the industry. The subscripts t-1 and t refer to the initial and end periods considered in a study. Dunn (1960) captured the proportionality effect by introducing differential rates of growth in individual industries within the shift-share model. This is said to be equivalent to the industry composition or mix effect, referred earlier. Ashby (1968) introduced a three component model of regional change. These three components were national share (NS), industry mix (IM) and regional shift (RS).

In the present study the variables IT exports[9] are to be decomposed. Thus, the model for IT exports is as follows:

Expressing the above symbolically we have the following equations:

$$\Delta xi \equiv xi,\ t - xi,\ t - 1 \equiv NSi + IMi + RSi \tag{3}$$

Here

$$NSi \equiv xi,\ t - 1\ (\frac{Xt}{Xt-1} - 1) \tag{4}$$

$$IMi \equiv xi,\ t - 1\ \left(\frac{Xi,\ t}{Xi,\ t-1} - \frac{Xt}{Xt-1}\right) \tag{5}$$

$$RSi \equiv xi,\ t - 1\ \left(\frac{Xi,\ t}{Xi,\ t-1} - \frac{Xi,\ t}{Xi,\ t-1}\right) \tag{6}$$

Thus, the symbol Δ refers to change and x_i refers to IT exports in different regions. X_i refers to IT exports at the national level, namely total Software of Technology Parks of India (STPI) exports, and X refers to total of all India non-factor services (NFS) exports. Subscript *i* refers to IT exports and the subscript *t* and *t-1* refers to the end and base period, respectively. NS refers to the national share, IM refers to the industry mix and RS refers to the regional share.

[9] As data pertaining to the IT sector alone are available only for exports, the study analyses the IT exports under a shift-share analysis.

Now following Randall (1973), the above equation 1 could be written as

$$\Delta xi - NSi \equiv IMi + RSi \quad (7)$$

Here the left hand side is the difference between the actual change and the national component. If the national component is deducted from the actual, the net result is the net relative change of exports over the base period. Thus, this equation is called the net relative change (NRC).

Method II: Econometrics – ordinary least squares

An endogenous growth model is attempted in econometrics by using ordinary least squares estimation. As the shift-share analysis only identifies the region or country as factors responsible for growth, the study was intended to go deeper to find out the specific regional factors responsible for the regional influences in the growth of IT. The growth or decline that takes place in different regions could be the result of favourable or unfavourable external environment or regional endogenous factors, such as the locational advantages and disadvantages. However, to measure endogenous growth, there is no universally available variable. Review says that the regional shift (RS) component derived from the shift-share analysis can serve as a reasonable proxy to act as a dependent variable in a model of endogenous growth. The model is thus developed to identify the endogenous factors leading to spatial variation in the performance of the software sector across leading states in India.

Considering the regional shift component as the dependent variable, an ordinary least squares regression is being run by using five independent variables, namely enrolment in higher education, population, location quotient, electricity consumption and teledensity. Here it is hypothesized that the five independent variables are the determinants of endogenous growth that may account for spatial variations in IT performance across Indian states. In other words, it could be said that these independent variables in the model are assumed to serve as potential regional endogenous factors that might influence software export sector performance. Explaining the influence of these potential factors it is seen that the success of the software industry depends on the following.

First, the existence of skilled workers. It is often proposed that regional growth is enhanced in certain regions by the existence of skilled workers, the availability of employment opportunities, opportunities for a wide range of skills and the existence of higher income jobs. The IT sector is no exception to this. However, it also calls for

highly skilled personnel. Therefore, the variable, state-wise enrolment[10] in higher education, was incorporated in the model to assess those effects.

Second, population is used as a dynamic measure of the size of the region.

Third, the study investigates the nature of the software industry structure in the 10 states and the effect of the industry's specialization on the region's endogenous growth. An appropriate measure to this effect could be the location quotient, which is used to measure the concentration of a particular industry in a defined area. Location quotient (LQ) is defined as a ratio of percentage share of a particular sector, say real estate, ownership of dwellings and business services (REODBS)[11] in terms of services sector of the state, to the percentage share of REODBS at the national level, to the services sector at the national level. LQ of greater than one means that the state has a larger share of that industry. Precisely LQ explains the localization of a particular industry in a given state. This can be expressed as follows:

$$LQ = \frac{\textit{State REODBS output}}{\textit{State Service GDP}} \; X \; \frac{\textit{India's Service GDP}}{\textit{India's REODBS output}}$$

Fourth, teledensity and broadband penetration/connections are used to incorporate the potential effect of teledensity on the regions' endogenous growth.

Fifth, one of the prerequisites to attract the IT sector to different regions is the availability of uninterrupted electric power. Availability of electricity is considered as a factor influencing endogenous growth of the software sector. Instead of using total available electricity, state-wise per capita electricity consumed is used as one of the variables, as it clearly indicates the actual availability.

Thus, the competitiveness of a region, namely the regional shift (RS) component is hypothesized to be dependent upon availability of teledensity, the regions enrolment in higher education, the extent of electricity consumption, population of the region and the degree of specialization, namely location quotient.

[10] The number of skilled persons available would be an ideal variable. Since this is available for census years only, data from the Ministry of Human Resource Development of India on enrolment in higher education are being used as a proxy.

[11] The aim of this study is to look into the IT sector independently. However, as the IT sector data are subsumed under REODBS, the study is forced to consider REODBS data. Although it is known that (REODBS) data are a combination of all three. These data are considered because state-wise disaggregated data on computer services were not available. Added to this, these combined industries are interrelated.

The linear model for ordinary least squares estimation is expressed as follows:

$$Y = C + aX_1 + bX_2 + cX_3 + dX_4 + eX_5 + \varepsilon$$

With reference to the variables, the above equation could be expressed as:

$$RS_i = EHE_i + POP_i + LQ_i + EC_i + TD_i + \varepsilon$$

Here $Y(RS_i)$ is the regional shift component derived from the shift-share analysis of growth in IT exports, $X_1(EHE_i)$ refers to enrolment in higher education, $X_2(POP_i)$ refers to population, $X_3(LQ_i)$ refers to location quotient, $X_4(EC_i)$ refers to electricity consumption, $X_5(TD_i)$ refers to teledensity, ε is the error term and a, b, c, d and e are coefficient of the variables. A direct relationship between dependent variable and the independent variables is assumed and a regression is run to produce the results in the next chapter.

Method II: Econometrics – Granger causality test

As regional development is closely related to positive higher growth in per capita income of that region, a causal relationship between regions' per capita income and IT exports is studied to determine how IT exports have contributed towards the development of IT hubs and improved the standard of living of the population in the region. To test the bi-directional causality between two variables the standard Granger causality test (Granger, 1969) was used in the present study. The theory of causation states that if the past values of variable Y improve the forecast of variable X, then it can be said that variable Y Granger causes variable X and vice versa. The Granger causality model is given as below:

$$X_t = \alpha_0 + \alpha_1 X_{t-k} + \ldots\ldots\ldots + \alpha_n X_{t-n} + \beta_1 Y_{t-1} + \ldots\ldots\ldots + \beta_n Y_{t-n} \quad (1)$$

$$Y_t = \alpha_0 + \alpha_1 Y_{t-1} + \ldots\ldots\ldots + \alpha_n Y_{t-n} + \beta_1 X_{t-1} + \ldots\ldots\ldots + \beta_n X_{t-n} \quad (2)$$

Here X_t and Y_t are all possible pairs of (XY) series. The null hypothesis H_0 for equation (1) is $\delta_l = 0$ for all l's against the alternative hypothesis H_1: $\delta_l \neq 0$ for some l's. Similarly, for equation (2) H_0: $\theta_l = 0$ for all l's against H_1: $\theta_l \neq 0$ for some l's. Thus, it can be stated that the Granger causality test is to see how many lags of Y_t are jointly significant in an equation of X_t and vice versa. To test the joint significance of coefficients F-test is applied.

The Granger test is sensitive to the lag length selection hence the robustness of result of the test is subject to optimal lag selection. Akaike information criterion (Akaike, 1974) is commonly used for lag length selection of optimal lag structure. To avoid the probability of spurious regression, the Granger causality test is applied

only on stationary series. To test the presence of unit root in a series Augmented Dickey-Fuller Test is commonly used (Dickey and Fuller, 1979). The Granger causality test is valid only if the variables in question are not co-integrated (Engle and Granger, 1987). Hence, it is important to check the stationarity of each of the variables and the co-integrating relation between the concerned variables before Granger causality test is performed.

Thus, to understand the interrelationships between the different components of the endogenous growth model, causality testing is undertaken. Aiming to see whether the state's change in per capita income are the result of changes in IT exports and changes in the real estate, ownership dwellings and other business services sector, it is assumed that the null hypothesis to be tested as change in a state's IT exports does not influence the change in per capita income of the respective state. To test it bi-directionally entails looking to ascertain if change in IT exports causes the change in state's per capita income or change in state's per capita income causes change in IT exports of the state.[12] Similarly, by considering the null hypothesis to be tested as change in GDP of REODBS sector of state do not influence the change in per capita income of the respective state and testing it bi-directionally whether change in GDP of REODBS sector of state causes change in state's per capita income or change in state's per capita income causes change in GDP of REODBS sector of state is determined.

V. DATABASE[13]

Information technology export data under the title "State-wise Software Exports made by registered units through STPI for last three years in Rupees Crore" are published in STPI annual reports. STPI annual reports for 2006/07, 2007/08, and 2009/10 have been used. Higher education data were procured from the 2008/09 annual report. Following the change in the format of data dissemination in the annual reports of the Ministry of Human Resource Development of India after 2008/09, Indiastat.com data were used for the years 2008/09, 2009/10, 2010/11 and 2012/13 on "state-wise enrolment of students in higher education", which compiles the data from the reports of the ministry. State-wise data on teledensity per thousand population for the years 2006/07 to 2010/11 were collected from *Infrastructure Statistics 2013* and data for the year 2012 from *Infrastructure Statistics 2014*. Instead

[12] Only the top three southern states, Karnataka, Andhra Pradesh and Tamil Nadu, have been done because of a time constraint. It could be extended to other states in later work.

[13] Database has been kept brief to reduce the bulk of the paper. It could be given to interested readers on request.

of making use of state-wise per capita electricity consumption, state-wise data under access "Industrial Electricity Consumption" (gigawatt hour) for the years 2005/06 to 2009/10 from *Infrastructure Statistics 2013*. Data for the 2011/12 are taken from *Infrastructure Statistics 2013*. Sector wise GDP[14] data are collected from the state GDP series published by the Central Statistical Organization, India. All India GDP data sector wise are collected from the site of Ministry of Statistics and Programme Implementation of India. The 1993/94 and 1999/00 series data for those states are adjusted for 2004/05 prices and the whole data set of the states as well as central data used are for 2004/05 prices.

VI. EMPIRICAL RESULTS AND ANALYSIS

The results of the shift-share analysis were arrived at by fitting the data into the models/formulas and calculations of different components of the model using excel sheets. These were then tabulated as different tables. Ordinary least squares estimation was carried out for the two different periods using four different models for each period in Excel. A Granger causality test between change in IT exports and change in per capita income of state and vice versa and change in per capita income of state and change in GDP of the REODBS sector and vice versa was done in EViews. Only two lags are used for arriving at the results.

Results of the shift-share analysis on information technology exports by states 2004/05 and 2008/09

In the shift-share analysis of IT export revenue of ten states in India for 2004/05 and 2008/09, it can be seen in table 1A that overall total STPI exports increased by 122 per cent and total non-factor service exports increased by 99.9 per cent.[15] During this period, except for Delhi, which recorded a negative actual change, in absolute terms, software export revenue for other states had increased. Software export revenue witnessed a relative decline, namely a negative net relative change (NRC) in Delhi, Haryana and Punjab. This decline was mainly influenced by the regional component, with industry mix constituting a negative contribution.

[14] Although specific IT sector data were not accessible, a Granger causality test with the data on REODBS was undertaken, as this includes the share of the IT industry. It was not possible to get the state-wise breakup of such data.

[15] The results do not reflect to what extent NFS exports have increased. However, since such information is calculated. It has been mentioned.

The reasons for the negative net relative change in the results for the three states, Delhi, Haryana and Punjab, are obviously seen in the findings of NASSCOM and a study carried out by NASSCOM and A T Kearney (2008), which pointed out that as far as Delhi is concerned, industry participants perceive the government to be bureaucratic with little focus on the IT business process management. An example of the Government's apathy is that policy drafted in 2000 has not been updated. Delhi needs to address problems of power, water shortage, local connectivity and crime to attract the IT business process management industry.

Furthermore, the same report states that in Haryana, Gurgaon has experienced growth as an IT business process management[16] hub because of its proximity to Delhi and seven operational special economic zones. The report has seen an outsourcing boom in the business process management segment on account of the good English speaking skills of its people. This boom has led to the mushrooming of malls, restaurants and entertainment facilities. The growth of the IT industry is restricted because of frequent power shortages, lack of local connectivity and a high crime rate, which lead to high operational costs. Although real estate space is available, the government needs to develop commercial space to allow plug and play facilities.

In Punjab, the report of NASSCOM and A T Kearney (2008) points out that the state needs to enhance the visibility of locations, such as Ludhiana and Mohali, by investing in engineering and technical education, and improving English language proficiency. In Punjab transport connectivity whether it is local, national and international is poor and needs to be improved in order to attract the IT business process management industry. Both commercial and residential complexes need to be developed in the space available.

During this period, software exports from the IT-dominated states of Andhra Pradesh, Karnataka, Maharashtra and Tamil Nadu increased by large amount even though they began from a high base in 2004/05. States, such as Gujarat and Kerala recorded a large increase in net relative change because their exports in the base year were low.

[16] NASSCOM has rebranded the information technology enabled services/business process outsourcing to business process management in 2012.

Table 1A. Shift-share analysis of Software Technology Parks of India's IT export growth by regions, 2004/05 to 2008/09

States	IT growth		Share in net relative change (%)	
	Actual	Net relative change	Industry mix	Regional shift
Andhra Pradesh	197.9	97.9	22.9	77.1
Delhi	-43.0	-142.9	-15.7	115.7
Gujarat	438.2	338.3	06.6	93.4
Haryana	65.4	-34.5	-64.9	164.9
Karnataka	102.4	02.4	923.8	-823.8
Kerala	430.0	330.0	06.8	93.2
Maharashtra	191.3	91.3	24.5	75.5
Punjab	46.0	-53.9	-41.5	141.5
Tamil Nadu	108.6	8.6	259.6	-159.6
Uttar Pradesh	113.0	13.0	171.8	-71.8
India	122.3	22.4	100.0	0.0

Further observing table 1A columns 4 and 5, regional variations in software exports were largely due to the regional component. An examination of the industry mix shows that in such states as Karnataka, Tamil Nadu and Uttar Pradesh export earnings increased because of a favourable industry mix, namely the industry structure in those states supported the IT industry. In Karnataka and Tamil Nadu, the IT sector is concentrated in Bengaluru and Chennai, both leading IT hubs in the country. STPI[17] (in Bangalore, Mangalore, Mysore and Hubli, Chennai, Coimbatore, Madurai, Trichy, Pondicherry and Tirunelveli), special economic zones[18] (Karnataka has 17 IT-information technology services special economic zones and Tamil Nadu 16 such zones), IT parks and state policies all played an important role in promoting the industry. The deregulation of the telecom sector helped both states to have the best telecom infrastructure by ensuring high bandwidth connectivity to global destinations. The presence of other industries, such as aerospace, telecommunication, machine tools, engineering, electronics and banking helped to provide domain expertise to the

[17] India, Ministry of Information and Information Technology, Software Technology Parks of India Several Annual Reports (New Delhi). Available from www.stpi.in.

[18] Available from sezindia.nic.in.

IT sector. Both states offered good physical and social infrastructure, which was the prime factor behind the recruitment of talented professionals both domestically and from multinationals. Excessive concentration of IT business process management companies in those locations has led to traffic congestion, rising real estate and labour costs, a shortage of hotel rooms and high attrition.

Further observing table 1A column 4, it can be noted that the positive net relative change for Karnataka, Tamil Nadu and Uttar Pradesh may be attributed to a favourable industry mix. This can be explained by the results of the NASSCOM and A T Kearney study, which points out that IT business process outsourcing firms were of the view that the government of Karnataka had not supported the growth of the IT sector sufficiently and is riding on the boom that started a decade ago. The same report mentioned that the government of Tamil Nadu support for IT business process management development in Chennai had lessened with more attention being focused on other locations in the state, namely Coimbatore, Madurai and Trichy.

As far as IT in Uttar Pradesh is concerned, the report indicated that the state government strived to leverage central government policies relating to e-governance, wide area networks, high speed telecom links and central agencies, such as those of STPI and special economic zones to build software technology parks and IT enabled services special economic zones. For Uttar Pradesh to emulate the success of Noida in other tier II and tier III cities, the local government needs to (i) develop the Lucknow-Kanpur corridor[19] on the lines of Noida-Greater Noida; (ii) improve connectivity, the social and living environment and recreational facilities, (iii) provide commercial and residential space and (iv) change the negative perception of careers in the business process management industry.

For the second period 2009/10 to 2013/14 the shift-share analysis presented in table 1B shows that the actual increase in IT export revenue was negative in seven out of the ten states and the net relative change was negative for all the states. These variations are due to the industry mix, which is quite obvious from the change in structure from STPI to special economic zones which is explained below. The possible reason for the decline in IT exports from STPI units as pointed out in their annual

[19] Uttar Pradesh Infrastructure & Industrial Development Principal Secretary Surya Pratap Singh, who is also the chairman and chief executive officer of the Lucknow Industrial Development Authority recently approved the Draft Master Plan 2031 of an integrated industrial township on the Lucknow-Kanpur highway, spanning 30,000 hectares during a recent board meeting. He also said: "There is tremendous potential of developing Lucknow-Kanpur industrial corridor on the lines of Noida and Greater Noida, as robust transport infrastructure is already present in the area. However, we have to hasten the process of development in view of rapidly growing urbanization and aspirations of people of the state capital". The comments are available from www.travelnewsdigest.in.

reports[20] was that the fiscal benefit of STPI scheme was withdrawn on 31 March 2011. This imposed a tax burden on the IT business process management sector, adversely affecting their growth. With the passing of the Special Economic Zone Act in 2005, firms moved from STPI to special economic zones. The large IT companies made new investments in special economic zones and also shifted their existing IT business process management business to the zones. This has resulted in a decline in the membership of STPI which has adversely effected their export performance.

Table 1B. Shift-share analysis of Software Technology Parks of India's export growth by regions, 2009/10 to 2013/14

States	IT growth		Share in net relative change (%)	
	Actual	Net relative change	Industry mix	Regional shift
Andhra Pradesh	-2.2	-50.8	99.8	00.2
Delhi	-54.4	-102.9	49.2	50.8
Gujarat	02.6	-46.0	110.2	-10.2
Haryana	-8.8	-57.4	88.3	11.7
Karnataka	13.8	-34.8	145.7	-45.7
Kerala	00.3	-48.3	104.9	-4.9
Maharashtra	-10.7	-59.3	85.4	14.6
Punjab	-27.4	-76.0	66.6	33.4
Tamil Nadu	-16.5	-65.1	77.8	22.2
Uttar Pradesh	-7.1	-55.7	90.9	09.1
India	-2.1	-50.6	100.0	00.0

Results of the ordinary least squares estimation

Consider that the regional shift component as the dependent variable, ordinary least squares is run by using five independent variables, namely teledensity (TD), enrolment in higher education (EHE), industrial electricity consumption (IEC), population (POP), and location quotient (LQ). These independent variables in the model are assumed to serve as potential regional endogenous factors that might influence software export sector performance. It is hypothesized that the

[20] STPI annual reports 2009/10, 2010/11, 2011/12, 2012/13.

competitiveness of a region, namely the regional shift (RS) component is dependent upon availability of teledensity, the region's enrolment in higher education figures, the extent of industrial electricity consumption, population of the region and the degree of specialization, i.e. location quotient.

The four models for the first period 2004/05 and 2008/09 are as follows:

Model 1 – Data used for EHE, LQ, POP, IEC and TD are averages during the period 2004/05 and 2008/2009. For two states, Maharashtra and Tamil Nadu, teledensity are for the corresponding capitals/cities, Mumbai and Chennai.

Model 2 – Data used for EHE, LQ, POP, IEC and TD are the average during the period 2004/05 and 2008/09. Unlike model 1, here teledensity data are for all states, cities are not considered.

Model 3 and *Model 4* – Data used for EHE, LQ, POP, IEC and TD are for any random year and teledensity data are for all states.

The results in table 2 show that in three out of the four models, the results are significant. One explanatory variable, enrolment in higher education is significant and positively related to the dependent variable. However, the other four explanatory variables, namely population, location quotient, industrial electricity consumption and teledensity show significant results with a negative relationship with the dependent variable.

In observing table 2, it appears that in all the models in the first period – 2004/05 to 2008/09, location quotient, namely regional specialization, was significant (at a level of 5 per cent), but was negative. A unit increase in the location quotient decreased the regional competitiveness by more than 270 units, clearly indicating that regional specialization had reached a saturation level in the prominent IT hubs, such as Bengaluru, Chennai and Hyderabad. Excessive concentration of IT business process companies in those locations had led to traffic congestion, rising real estate and labour costs, a shortage of hotel rooms and high attrition. This had also been supported by Pais and others (2006) who found that because of a heavy concentration of IT clusters in a particular region, demand for hotels and restaurants had increased, leading to high hotel occupancy rates and average room rates. This reflected the lack of local policy measures relating to, for example, transport infrastructure, land availability and real estate construction.

Table 2. Results of ordinary least squares using regional shift as a dependent variable, 2004/05 to 2008/09

Model	Intercept	EHE	LQ	POP	IEC	TD
Model 1	313.81**	7.07***	-260.61**	-5.53**	-0.90*	-1.85**
Adjusted R^2	0.73					
F	5.90					
Model 2	196.51	3.62*	-163.26	-2.68	-0.68	-1.14
Adjusted R^2	0.29					
F	1.75					
Model 3	322.45**	5.91**	-233.81**	-5.32**	-1.55*	-2.37**
Adjusted R^2	0.65					
F	4.46					
Model 4	387.57**	6.82**	-277.56**	-6.08**	-1.88*	-2.68**
Adjusted R^2	0.66					
F	4.63					

Notes: Significance codes *** 0.01, ** 0.05, * 0.1.
EHE, enrolment in higher education; LQ, location quotient; POP, population; IEC, industrial electricity consumption; TD, teledensity.

In the case of enrolment in higher education, the models showed that the variable was significant at the 1 per cent or 5 per cent levels. A unit increase in enrolment in higher education was said to increase regional competitiveness by a minimum of 5.91 units. The easy availability of skilled labour related to the IT sector is very evident from the results. This is also substantiated with data brought out in the IT review chapter, which indicated that the ten states accounted for about 80 per cent of the country's authorized Engineering and Technology and Masters in Computer Applications degree granting institutions and sanctioned intake.

The variable population, although significant at a 5 per cent level, is negative, indicating that a unit increase in population reduces competitiveness by at least 6.1 units. The negative effects of excessive population are very much reflected here.

The industrial electricity consumption variable is significant at 10 per cent and is negative, implying a unit increase in it resulting in a decrease in regional competitiveness by a minimum of 1.9 units. The results bring about a clear picture of the supply-demand mismatch of electricity, the mismatch between electricity requirement and electricity availability. Lack of availability of electricity to the required

level is indicated and any increase in demand for electricity beyond this level would affect the regional competitiveness. Teledensity is significant at the 5 per cent level and negative, indicating a unit increase in teledensity would lead to a decrease in local competitiveness by 2.7 units. This is obvious from the fact that telecommunication (fiber optic communication) has now become a basic need, therefore its effective coverage through efficient infrastructure need not be overemphasized. According to the Telecom Regulatory Authority of India (TRAI, 2011), an increase in demand for communication infrastructure (adequate bandwidth at affordable prices) can be attributed to increased Internet usage, e-commerce, e-governance, e-banking, e-entertainment, e-health, convergence of information, communication and entertainment sectors, voice, video and data traffic, among others. The government's initiative aimed at bridging the digital divide and improving broadband connectivity through its ambitious National Optical Fiber Network project aiming at extending broadband access to the country's 250,000 gram panchayats by 2016 is expected to further increase demand for communication infrastructure.[21] This requires each state and local government to be proactive in the provision of communication infrastructure, which includes giving permission, among other things, for right of way,[22] and the erection of towers, and mobile virtual network operators. All these factors clearly indicate the extraordinary demand in this sector, which is implied in the result.

The Telecom Regulatory Authority of India (TRAI) also has mentioned that in order to avoid any inconvenience caused by repeated digging, the central and state roadways authority may consider laying ducts and conduits while roads are being built to facilitate the laying of other cables when required. However, cities in India are to a greater extent unplanned wherein the systematic laying of electric cables, fiber optic cables, and water and gas pipelines is a rare phenomenon. The lack of coordination between those sectors often leads to congestion, which ultimately results in diseconomies. The results also highlight this.

Overall, it could be said that, except for enrolment in higher education, the variables have shown an inverse relationship which contradicts the hypothesis of a positive relationship, clearly indicating the diseconomies related to those variables. The results point out that the existing infrastructure is overstressed, caused by excessive pressure on teledensity, a shortage of power and the high population, making it difficult for regions to sustain a high level of specialization.

[21] Available from www.indian infrastructure.com.

[22] Right of way permission is granted to licensed telecom operators and registered infrastructure providers for laying telecom cables and ducts under, over, along, across, in or upon a property vested in or under the control or management of a local authority or of any person including public authority, public corporation and autonomous body.

For the second period 2009/10 and 2013/14, there are four other models, which are as follows:

Model 1 – Data used for EHE, LQ, POP, IEC and TD are the average during the period 2009/10 and 2013/14. For one state, Maharashtra teledensity data are for the corresponding capital/city, Mumbai.

Model 2 – Data used for EHE, LQ, POP, IEC and TD are the average during the period 2009/10 and 2013/14. In this model teledensity data are for the states, no city is considered.

Model 3 – Data used for EHE, LQ, POP, IEC and TD are for a single year. For one state, Maharashtra, teledensity data are for the corresponding capital city, Mumbai.

Model 4 – Data used for EHE, LQ, POP, IEC and TD are for a single year. In this model, teledensity data are for all states.

In table 3 it can be seen that the regression/ordinary least squares results in all the models in the second period – 2009/10 to 2013/14 – showing the variable location quotient, an industry concentration significant at the 5 per cent or 10 per cent levels. Regional competitiveness would increase by a minimum of 132 units for every one unit increase in location quotient. This clearly indicates that reducing the concentration beyond the optimum level would surely help in improving the results. The fact in the second period is the decrease in STPI membership. The decline in exports from STPI registered units since 2009/10 is because of the decline in membership in STPI. The reason behind this is that the fiscal benefit of an income tax exemption (10A) of the STPI scheme ended on 31 March 2011. The withdrawal of such tax holidays has resulted in increased taxes payments and surcharges required from the IT and IT enabled services. This has adversely affected the growth of the sector. Although the Special Economic Zone Act was passed in 2005, as per the STPI annual report, the movement of firms to special economic zones was said to be in 2009 in order to take advantage of incentives associated with special economic zones. Larger IT companies initiated new investments in special economic zones and also shifted their existing IT and IT enabled services business to those zones. This has resulted in a decline in membership of STPI, which has affected their overall export performance. Nevertheless, the change has had its own advantage in that the decline in STPI membership of IT firms led to a reduction in congestion in those locations, resulting in optimal utilization of existing resources. Thus, the significant location quotient gave a positive result.

Table 3. Results of ordinary least squares using regional shift as a dependent variable, 2009/10 and 2013/14

Model	Intercept	EHE	LQ	POP	IEC	TD
Model 1	-60.42	-1.95095	131.9975*	-0.885695	0.679031	-0.78907
Adjusted R^2	0.19					
F	1.44					
Model 2	-65.37	-3.26658*	160.5587**	1.882268	0.77609	-1.17819
Adjusted R^2	0.16					
F	1.34					
Model 3	-57.37	-2.34407*	136.669*	1.228093	0.646763	-1.08226
Adjusted R^2	0.32					
F	1.44					
Model 4	-42.70	-2.61429*	143.8488*	1.301374	0.499578	-1.31423
Adjusted R^2	0.20					
F	1.45					

Notes: Significance codes: ***0.01, **0.05, *0.1.
EHE, enrolment in higher education; LQ, location quotient; POP, population; IEC, industrial electricity consumption; TD, teledensity.

In the case of enrolment in higher education three out of the four models show the variable to be significant, at the 10 per cent level, and negative. A unit increase in enrolment in higher education is said to decrease regional competitiveness by a minimum of 3.27 units. The considerable increase in engineering colleges and lucrative jobs/white collar jobs in IT and IT enabled services firms and the opportunities to move to the United States and Europe have prompted a number of students, especially those from the southern states, to attain graduate or post-graduate degrees in software engineering. This has led to a large supply of human resources in this sector. The results also support this fact.

Results of Granger causality

The results of the Granger causality in table 4 indicate that in the three states reviewed, per capita income of the state does not influence IT exports of that state. However, with regard to IT exports influencing the per capita income, there are no significant results for the states Andhra Pradesh and Tamil Nadu, but for Karnataka, the results are significant, indicating that IT exports of Karnataka influence the per capita income of the state. The supportive facts behind this seems to be that the

Bengaluru cluster has played a vital role in innovation and upgrading value as contemplated by Porter (1998). This has been possible because the most sophisticated buyers are part of this cluster. It has been shown that the growth of many research firms and academic institutions over a long period has led to the formation of an educated, cosmopolitan population in Bengaluru with a stronger influence on policy framing than in other Indian cities. Bengaluru has a history of proactive planning and consultative and participatory policymaking in the form of implementation of the Panchayati Raj Act, the Nagarpalika Act and the Bengaluru Agenda Task Force and the establishment of the Karnataka Lokayukta Institution, which strengthened the ability of local bodies to determine local development priorities, influence the direction of funding allocation, increased targeting of services to local needs and desires and increased transparency. Participatory models increase the citizens' direct involvement in the deliberation, formulation, implementation and monitoring of public policy. The Bengaluru IT cluster has been nurtured by active venture capitalists and some degree of interfirm cooperation, largely outside the purview of large bureaucratic firms and financial institutions. All this has made it more attractive and easier for foreign customers to source from different vendors. However, in the case of Andhra Pradesh and Tamil Nadu, the initiatives of the respective state led to the development of the IT business process management industry. Policy initiatives and e-governance initiatives are behind the emergence of the Hyderabad and Chennai IT hubs in India.

In the case of causality between GDP of REODBS and per capita income of the states in Andhra Pradesh and Tamil Nadu, some significance is evident whereas it is totally insignificant in the case of Karnataka in which neither REODBS influence per capita income of Karnataka nor per capita income of Karnataka influence GDP of REODBS sector (table 5).

In the case of Andhra Pradesh, GDP of REODBS does not influence per capita income, but per capita income influences GDP of REODBS. In the case of Tamil Nadu, GDP of REODBS and per capita income are influenced by one another. Andhra Pradesh and Tamil Nadu have adopted a low-key IT policy that strongly focuses on social and regional equity and extends incentives to women and backward caste entrepreneurs to set up IT centres in small towns. This has led to brain drain from the two states, Andhra Pradesh and Tamil Nadu, resulting in an increase in remittances and investment in real estate, which could be a valid reason for REODBS to influence the per capita income of the state.

Table 4. Results of the pairwise Granger causality tests

Particulars		**Karnataka**		
Tests:		Pairwise Granger causality tests		
Sample/lags: 2				
Null hypothesis:	Obs	F-statistic	Prob.	
DITEXPORT does not Granger cause DPCI	13	2.98754	0.1074	**Significant**
DPCI does not Granger cause DITEXPORT		0.53687	0.6042	**Not significant**
Particulars		**Andhra Pradesh**		
Tests:		Pairwise Granger causality tests		
Sample/lags: 2				
Null hypothesis:	Obs	F-statistic	Prob.	
DITEXPORT does not Granger cause DPCI	13	0.5779	0.5829	**Not significant**
DPCI does not Granger cause DITEXPORT		2.52567	0.1412	**Not significant**
Particulars		**Tamil Nadu**		
Tests:		Pairwise Granger causality tests		
Sample/lags: 2				
Null Hypothesis:	Obs	F-Statistic	Prob.	
DITEXPORT does not Granger cause DPCI	17	0.94702	0.4151	**Not significant**
DPCI does not Granger cause DITEXPORT		5.1344	0.0245	**Not significant**

Table 5. Results of the pairwise Granger causality tests

Particulars		**Karnataka**		
Tests:		Pairwise Granger causality tests		
Sample/lags: 2				
Null hypothesis:	Obs	F-statistic	Prob.	
DREALESTATE does not Granger cause DPCI	13	0.69554	0.5266	**Not significant**
DPCI does not Granger cause DREALESTATE		0.41204	0.6756	**Not significant**
Particulars		**Andhra Pradesh**		
Tests:		Pairwise Granger causality tests		
Sample/lags: 2				
Null hypothesis:	Obs	F-statistic	Prob.	
DREALESTATE does not Granger cause DPCI	14	0.35091	0.5656	**Not significant**
DPCI does not Granger cause DREALESTATE		16.9085	0.0017	**Significant**
Particulars		**Tamil Nadu**		
Tests:		Pairwise Granger causality tests		
Sample/lags: 2				
Null hypothesis:	Obs	F-statistic	Prob.	
DREALESTATE does not Granger cause DPCI	17	3.40485	0.0674	**Significant**
DPCI does not Granger cause DREALESTATE		7.40399	0.008	**Significant**

VII. POLICY IMPLICATIONS

For the IT sector to develop fully, there must be demand for IT both nationally and internationally. The IT sector in India is more an export-oriented sector. The disproportionality in growth between the export and domestic segments needs to be corrected. In the last couple of years, e-commerce has been driving the rapid growth of the IT business process management domestic industry. Almost all industries leverage the benefits of IT. Synergies are prevalent with banking, financial services

and insurance, manufacturing, retail, telecommunication, health care and government, all of which constitute the key business verticals of the industry. This integration needs to be further strengthened for IT to act as a powerful facilitator and catalyst of growth. This would help to generate employment opportunities and contribute towards the development of the region where it is located.

VIII. CONCLUSION

Thus, it could be seen that the results of the shift-share analysis of IT export revenue of ten states in India for the period 2004/05 showed that software exports trended higher from the IT-dominated regions, namely Andhra Pradesh, Karnataka, Maharashtra and Tamil Nadu. Other states, such as Gujarat and Kerala were depicted to have experienced a large increase in net relative change, mainly because their exports in the base year were low.

Regional variations in software exports were largely due to the regional component (regional shift). The examination of the industry mix shows that in some states, including Karnataka, Tamil Nadu and Uttar Pradesh, an increase in export earnings occurred on the back of a favourable industry mix. In Karnataka and Tamil Nadu, the IT parks and state policies, among other aspects, played an important role in promoting the industry. The deregulation of the telecom sector helped both states to have the best telecom infrastructure, which ensured high bandwidth connectivity to global destinations. The presence of other industries, such as aerospace, telecommunication, machine tools, engineering, electronics and banking helped to provide domain expertise to the IT sector. In addition, both states offered good physical and social infrastructure, which was the prime driver for attracting talent both domestically and from multinational corporations. Excessive concentration of IT business process management companies in these locations led to traffic congestion, rising real estate and labour cost, a shortage of hotel rooms and high attrition. The analysis also indicated that the positive net relative change for Karnataka, Tamil Nadu and Uttar Pradesh was due to a favourable industry mix.

The results of ordinary least squares estimation showed that in three out of the four models the results were significant. One explanatory variable, enrolment in higher education was significant and positively related to the dependent variable. However, the other four explanatory variables, namely population, location quotient, industrial electricity consumption and teledensity, showed significant results with a negative relationship with the dependent variable. Location quotient, namely regional specialization although significant (at a 5 per cent level) was negative. In the case of enrolment in higher education, all the models showed the variable to be significant. The easy availability of skilled labour related to the IT sector was shown to be very

obvious from the results. The negative effects of an excessive population were reflected here. The industrial electricity consumption variable was significant and negative, bringing about a clear picture of a supply-demand mismatch of electricity. Lack of availability of electricity to the required level was indicated and any increase in demand for electricity beyond this level would very likely affect the regional competitiveness.

The cases which indicated that teledensity was significant and negative showed the problems in unplanned cities in India in which the systematic laying of electric cables, fiber optic cables, and water and gas pipelines is a rare phenomenon. There are situations in which there is lack of coordination between these sectors congestion often occurs, which ultimately results in diseconomies. The results also highlight this. Overall, it can be said that except for enrolment in higher education, all other variables had an inverse relationship, which contradicted the authors' hypothesis of a positive relationship, clearly indicating the diseconomies related to those variables. The results pointed out that the existing infrastructure was overstressed as there was excessive pressure on teledensity, a shortage of power and high population making it difficult for regions to sustain a high level of specialization.

The Granger causality test pointed out that Karnataka showed significant results, indicating that IT exports of Karnataka influenced the per capita income of the state. In the case of Andhra Pradesh, per capita income influenced the GDP of REODBS and for Tamil Nadu, both GDP of REODBS and per capita income were influenced by one another.

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CHANGING URBAN CONSUMER BEHAVIOUR AND THE ROLE OF DIFFERENT RETAIL OUTLETS IN THE FOOD INDUSTRY OF FIJI

*Craig Johns, Pamela Lyon, Randy Stringer and Wendy Umberger**

The food industry is undergoing transformation globally. The set of circumstances specific to Fiji provides important insights into the drivers of this change, which have implications for private, government and donor agency stakeholders. A novel study of 1,000 urban households in Fiji found that among those surveyed, modern supermarkets have overtaken traditional markets as the dominant food retail outlet and now have 100 per cent patronage and take in 54 per cent of total household food expenditures. However, the battle for the fresh fruit and vegetable category appears to be in its infancy, with 97 per cent of households still shopping for products in this category at the traditional main market. Although foreign investment is a key driver of the retail food sector transformation in more rapidly growing developing countries, in Fiji, where foreign investment is relatively low, this transformation appears to be predominantly supported by rising urban income and changing consumer preferences. Consequently, policy attention should be directed towards market channels that can take advantage of changing consumer preferences, while still supporting local farmers.

JEL classification: E21, O19, R22.

Keywords: Consumer behaviour, food value chains, supermarket, small island developing States (SIDS), Fiji.

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I. INTRODUCTION: RETAIL TRANSFORMATION IN DEVELOPING COUNTRIES

Consumers globally are changing their food shopping behaviour, and the retail sector is transforming to meet their needs. In developing countries, this has resulted in an expansion in modern retail outlets along with a continuing trend of consumers purchasing a wider range of food products (Reardon and others, 2009). Some of the key factors behind this change are private sector investment in food chains, greater product choice, urbanization, time-poor consumers and greater disposable income (Godfray and others, 2010; Hazell and Wood, 2008; Pingali, 2007; Reardon, Timmer and Berdegue, 2004)

Evidence of "retail transformation" or a "supermarket revolution", and the subsequent transformation of global agricultural and food distribution and marketing systems, is well documented across the more rapidly growing developing countries (Pinstrup-Andersen, 2002; Reardon and Barrett, 2000; Reardon and others, 2003), with a number of studies targeting Asia (Cadilhon and others, 2006; Minten, Singh and Sutradhar, 2013; Reardon, Timmer and Minten, 2012; Tschirley and others, 2015) and Latin America (Alvarado and Charmel, 2002; Arda, 2006). Indonesia is an exemplar of rapid transformation in food retailing in a rapidly growing economy. In the decade from 1999 to 2009, modern food retailers increased more than ninefold (964 per cent) across the Indonesian archipelago, from 1,176 to 11,342 outlets (Dyck, Woolverton and Rangkuti, 2012).

Whether traditional outlets are capable of retaining their market share for fresh produce as modern retailers continue to grow — securing their continued importance to consumers, as suppliers of essential food, and to local producers, as reliable buyers of the fruits of their labour — is a matter of ongoing debate (Goldman, Ramaswami and Krider, 2002; Neven and others, 2006). The outcome of this retail tug-of-war has potentially profound implications in countries where agricultural production by smallholder farmers constitutes the dominant proportion of national economic activity.

The outcome is also not a foregone conclusion, as research shows considerable variation among different countries. In some development contexts, modern retailers tend to capture the processed food category first, while traditional outlets are able to hold market share for the fresh produce categories (Minten and Reardon, 2008). This has been the case in Hong Kong, China (Goldman, Ramaswami and Krider, 2002; Ho, 2005), Taiwan Province of China (Li and Houston, 2001), Thailand (Gorton, Sauer and Supatpongkul, 2009), Mexico (Anand, 2009) and Brazil (Zinkhan, Fontenelle and Balazs, 1999). However, in other countries, such as Malaysia (Chamhuri and Batt, 2009) and Kenya (Neven and others, 2006), traditional

retail outlets for perishable produce appear to be losing market share to modern outlets. Other contexts have produced conflicting results. In Viet Nam, for example, some studies suggest an ongoing role for traditional retailers (Maruyama and Trung, 2007), while others predict a continuing encroachment of modern retailing into the fresh food category (Mergenthaler, Weinberger and Qaim, 2009).

In virtually all of those countries, the transformation of the food retail landscape has been advanced by foreign direct investment, initially at least (Reardon and others, 2003). However, changing consumer demand and consumer preferences are other key factors behind retail change (Carpenter and Moore, 2006; Godfray and others, 2010). Understanding these preferences and how they lead to shopping behaviour, and then marshalling this knowledge to predict future trends is complex and difficult (Bawa and Ghosh, 1999; Cirera and Masset, 2010; Godfray and others, 2010). While food spending is typically correlated with income, and income is an important driver for change, it is not the only one, as shown by a recent comparison of food purchasing and the retail transformation in India and China. In both countries, culture played a significant role in how the retail food industry evolved. In India, for example, religious dietary restrictions prevented increases in the consumption of high-energy foods based on animal protein, which was a prominent feature in China, despite similar income levels in the two countries (Godfray and others, 2010).

Information concerning the transformation of food systems in small island developing States is strikingly limited, but much needed. The economies of these countries tend to have low levels of manufacturing, volatile agricultural production and share a cluster of identifiable challenges to productivity improvements in this sector (Douglas, 2006; McGillivray, Naudé and Santos-Paulino, 2008; Pelling and Uitto, 2001). In Fiji, for example, agriculture, livestock and subsistence farming generate income for approximately 65 per cent of the total population (Fiji, Department of Agriculture, 2009) and 13.1 per cent of gross domestic product (McGregor and others, 2010). Development of the entire food industry is a priority for the private sector, government and donor agency stakeholders, including Australia, which has a long-standing donor relationship with Fiji, and is strategically concerned with its economic development.

In 2010, the Government of Australia funded the Pacific Agribusiness Research for Development Initiative, a multidisciplinary research programme aimed at improving agricultural livelihoods in a number of Pacific Island countries, namely Fiji, Kiribati, Samoa, Solomon Islands, Tonga and Vanuatu. The collaborative project involved several Australian universities, Pacific government agencies, non-governmental organizations and the private sector on the respective islands where research was carried out. The strategy was to identify and prioritize potential development

inventions based on value chain and market analysis. A value chain analysis is a flexible framework capable of investigating food industry networks (Francis, Simons and Bourlakis, 2008; Simons and others, 2003; Taylor, 2005), with implications for poverty alleviation and policy development (Altenburg, 2006; Gereffi and Lee, 2012; Trienekens, 2011).

Fiji presents an interesting case study because its food retailing sector has developed in recent decades without the high level of foreign direct investment upon which other developing economies have relied. Nevertheless, Fiji features many of the other known drivers of food retail transformation at the consumer end of the value chain, for example, urbanization, rising urban income and changing consumer preferences. Thus, in Fiji, the usual significant "supply push" factors influencing consumer behaviour were notably absent, which led researchers to focus more strongly on the "demand pull" from consumers.

Understanding consumers and how they may be advancing change is particularly important with regard to small island developing States because the modernization of food retailing can bring a number of socioeconomic and health concerns. Although the impact of supermarket may differ by country and circumstance (Hawkes, 2008), one area of interest for a number of developing small island developing States, including Fiji, is the effect that increased consumption of heavily processed, imported food is having on diets, the prevalence of diet-related diseases and general health (Hughes and Lawrence, 2005; Popkin, 2006; Stamoulis, Pingali and Shetty, 2004; Thow and others, 2011a; 2011b). Increasing dependence on food imports is also raising food security concerns in Fiji, where it is feared that smallholder farmers may be being squeezed out of the value chain by supermarkets demanding higher quality, larger and more regular supply, and different payment methods, as what has already occurred in Africa and Asia (Boselie, Henson and Weatherspoon, 2003; Farina and Reardon, 2000; Hughes and Lawrence, 2005; Reardon and others, 2009). In small island developing States, if the local agricultural industry is at a disadvantage, this becomes a major development and political problem.

Under the auspices of the Pacific Agribusiness Research for Development Initiative, mapping of the entire horticultural industry in Fiji was conducted through surveys of consumers, producers and traders and interviews with the major supermarkets, food processors, hotels and municipal markets across the main island of Viti Levu, where 70 per cent of the population lives and works and the main urban centres of Fiji are located. The study of the entire horticultural industry was designed to better understand the changes occurring at each link in the value chain. While trying to understand this in the broad context of the entire horticultural industry, it has been hypothesized that consumer behaviour could be a leading factor in changes to

food retailing. The consumer survey, which is the focus of the present article, was conducted to better understand shopping patterns in the retail outlet and food category, and changes in consumption over the previous five years.

II. THE CONTEXT OF FIJI

While traditional markets (rural and urban) remain important for purchasing a variety of local foodstuffs in the urban areas of Fiji, over the years, it has become apparent that supermarkets have taken over a significant percentage of the market, with a mix of local, imported, processed and fresh food products. As elsewhere in the world, rural populations are dwindling in the Pacific as urbanization takes place (Jones, 2012). From 2002 to 2008, the rural population in Fiji is estimated to have declined by 2 per cent, while the total population grew by 6 per cent (to 815,408) and the urban population increased by 16 per cent (Narsey, 2011). During this period, the income of the average urban household increased by 51 per cent in nominal terms and 19 per cent in real terms, with about 25 per cent of the average household income being spent on food (Narsey, 2011).

The tourist industry has also affected the overall mix of products produced, imported and sold in Fiji. While these changes have been noted in a few studies (Chandra, 1979; Owen, 1999; Thaman, 1990), very little detailed analysis of the recent consumer behaviour in Fiji is available.

As part of the wider value chain mapping project in Fiji, a household consumer survey was designed to better understand changing urban consumer behaviour and the role of different retail outlets. In the absence of the kind of foreign retail investment seen in other developing countries, the focus of the present study was on how consumer behaviour might be influencing changes in food demand and how those changes could affect the horticultural industry. Furthermore, the study focused on the related policy implications for a range of public and private sector stakeholders. Throughout the evolution of different value chain methodologies, researchers have highlighted the importance of the final consumer in determining a product's or service's real value and hence the demand for it (Sahay, Gupta and Mohan, 2006; Zokaei and Hines, 2007). In a similar way, this study analyses consumer behaviour to better understand the effect it has along the value chain, and across the horticultural industry. The household food survey thus is the necessary first step to carrying out a value chain analysis of the horticultural industry in Fiji. While previous research has either looked at consumers or focused on specific sectors or links in the chain, it appears that this type of detailed analysis of an entire value chain has not been attempted in a small island developing State, such as Fiji.

III. METHODS AND DATA

Methods used by the Fiji Bureau of Statistics for previous surveys produced a representative sample of 1,000 households on opposite sides of the main island of Viti Levu in two of the key urban areas: Nadi, which hosts the international airport, and Suva, the capital city. Pre-existing enumeration area codes were used to distinguish between seven different income classes (high, middle, low, housing, squatter, urban village and misc./mixed). Using sampling procedures developed by the bureau, a representative sample of 50 enumeration area codes were selected across the Suva and Nadi urban areas. A random sample of 20 households was then chosen from each enumeration area code to make up the sample of 1,000 urban households in Fiji.

The survey questions and initial format were based on a similar survey conducted in Indonesia to investigate consumer and shopping behaviour across different food categories and retail outlets (Minot and others, 2015; Toiba, Umberger and Minot, 2015; Umberger and others, 2015). While the research provided a useful template for the study in Fiji, considerable effort was expended with the Fiji Bureau of Statistics and other project partners to tailor the survey to the context of Fiji. For example, previous food-related surveys in Fiji, including a 2008 household income and expenditure survey, were reviewed to help guide the methodology and identify gaps in the research. Thorough pre-testing was then conducted to further hone the questionnaire before it was finalized.

Through the questionnaire, information on household characteristics, assets and expenditure as well as on cooking and shopping attitudes and behaviour were collected. A major component of the survey covered 79 different food categories and captured the consumption of each category during the last month, including what was purchased, homegrown or exchanged. Novel questions that had not been previously asked in Fiji, identified the retail source from which each of the 79 food categories was normally purchased. These retail outlets were separated into the modern outlets of supermarkets, corner shops/butcher/bakery, restaurants, and fast food and service stations, and the more traditional outlets of the main market, fish market and roadside stall/hawker.

In the absence of suitable baseline data, questions were included to estimate how respondents' consumption and shopping patterns had changed in the previous five years. While subjective assessments of trends in purchasing behaviour are not an ideal comparator with current behaviour, they should provide some insight into self-perceived change over the recent past. The Fiji Bureau of Statistics has recently shown some interest in incorporating these types of questions into their household income and expenditure survey, so it is hoped that the current surveys will provide baseline data for future studies.

The survey was conducted in June and July 2012 using a team of 27 trained enumerators. While intercepting consumers in public areas, such as supermarkets and traditional markets, has become popular for its flexibility and lower cost (Hornik and Ellis, 1988), for this survey, face-to-face interviews targeting the person in the household most knowledgeable about food purchases were used. This method allows for a longer survey time and random representation across income levels, thus avoiding the issues associated with self-selection (Winship and Mare, 1992).

When surveys were completed by the enumerators, the quality of each one was checked in the field by team leaders to rectify any issues while access to the respondents was still possible. Completed surveys were then sent back to the Fiji Bureau of Statistics where the data were entered using a CSPro template to limit the number of entry errors before being cleaned and analysed.

IV. RESULTS

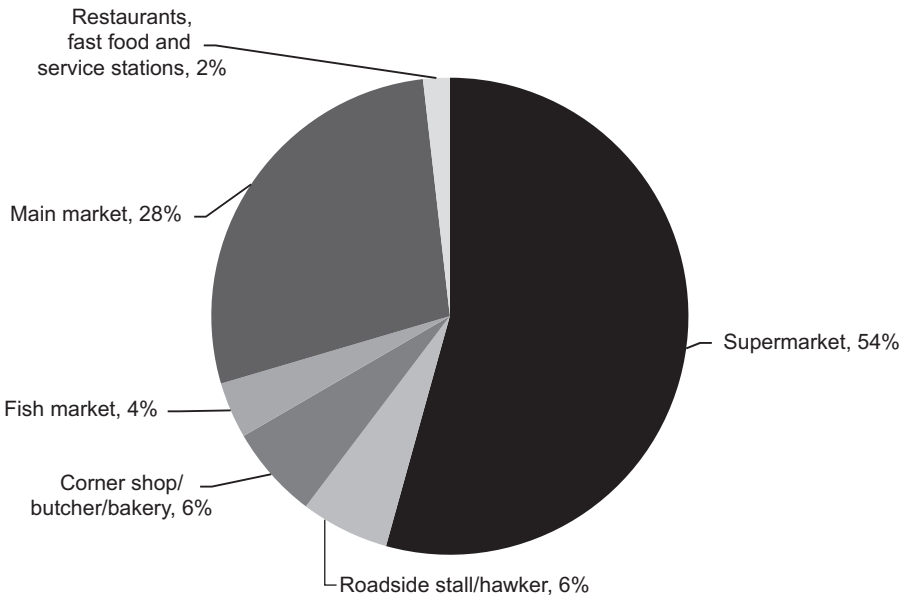
The results are reported in four sections. The first section describes the current shopping patterns of urban households in Fiji by retail outlet. The second section shows how household food purchasing is distributed across different food groups. The third explores respondents' beliefs about changes in consumption and shopping behaviour over the preceding five years and why these changes occurred. The fourth section investigates the share of food spending at different retail outlets by income level.

Current shopping patterns by retail outlet

Figure 1 displays the breakdown of urban household food expenditures in Fiji by retail outlet type. Most striking is how supermarkets have captured more than 50 per cent of the market share. In addition to supermarkets having the largest slice of urban food expenditures, table 1 illustrates that they have also recorded an impressive 100 per cent patronage from all the households surveyed, with 65 per cent of respondents reporting that they patronized a supermarket at least once per week.

While the urban population of Fiji has embraced modern supermarkets, the main traditional markets retain a substantial 28 per cent share of urban household food expenditure. Almost all, 97 per cent of the survey respondents, also reported patronage of traditional main markets. Thus, households' reported use of traditional markets is not far below supermarkets, with 63 per cent reporting that they visited a traditional market at least once a week. This suggests that urban consumers in Fiji make use of both modern and traditional outlets for their food purchases, with traditional markets still largely being preferred for fresh fruit and vegetables.

Figure 1. Share of urban food expenditure in Fiji by type of retail outlet



Source: Authors.

Table 1. Percentage frequency of food retail outlet use, n = 1,000

	Supermarket	Main market	Roadside stall/ hawker	Corner shop/ butcher/ bakery	Fish market	Restaurants, fast food and service stations
Every day	1	1	1	10	1	0
2-6 times/week	9	9	23	45	2	3
Once a week	55	53	22	18	30	4
2-3 times/month	27	23	15	12	26	7
Once a month	8	8	8	5	21	8
Few times a year	0	3	11	4	10	25
Never	0	3	20	6	10	53

Source: Authors.

Roadside stalls/hawkers present an interesting blend of traditional amenities and modern convenience, and enjoy a 6 per cent share of food expenditure by the urban dwellers in Fiji. Twenty-three per cent of survey respondents reported visiting roadside stalls/hawkers two to six times per week, while 22 per cent went once a week. However, approximately 20 per cent of households surveyed reported not patronizing roadside stalls/hawkers at all. On the other hand, corner shops/butchers/bakeries have a 6 per cent share of food expenditure but the highest rate of frequency of use. About 10 per cent of respondents said they had visited such shops every day, while 45 per cent went two to six times per week.

Perhaps surprisingly for citizens of an island country, dedicated fish markets command only a 4 per cent share of food expenditure among the urban population, with 77 per cent of urban households fairly evenly split between visiting once a week, two to three times per month, or once a month.

The remaining 2 per cent of food expenditure is shared among the following types of modern outlets: restaurants, fast food stations and service stations. However, more than half (53 per cent) of the households surveyed said they did not visit those outlets at all, which suggests they may be serving tourists more than the local population.

One factor in understanding the shopping patterns in Fiji is the distance to retail outlets and mode of transport from the surveyed households. One of the very few studies to cover this research topic in Fiji was undertaken in 1976 by Chandra (1979). Although restricted to intercept surveys at a limited number of retail outlets, the research of Chandra is interesting because he concluded that location and distance from the outlet was not a major factor behind purchasing behaviour. Even four decades ago, 45 per cent of people of Fiji surveyed had access to automobiles, and buses were also commonly used to get into town for food.

Similarly, the present study found that public transport, which consists mainly of buses, was the preferred method of transport to supermarkets (49 per cent), followed by walking (21 per cent) and automobile transport (21 per cent). Main market shoppers also used public transport, with 65 per cent preferring this mode of transport. By contrast, the roadside stalls/hawkers and corner shop/butcher/bakery outlets, which are visited more frequently, were generally accessed on foot. The majority of consumers walked to roadside stalls/hawkers (66 per cent) and corner shop/butcher/bakery outlets (79 per cent), which tended to be, on average, less than a kilometre from the patrons' homes (0.9 km and 0.7 km, respectively). This compares to the longer average distances travelled to supermarkets (1.9 km) and further to the main town market (3.1 km).

Shopping patterns by food category

To simplify the interpretation and gain clearer insights from the results, 79 food products were aggregated into seven core food groups to separate the fresh and processed food products and to categorize them nutritionally:

1 *Fresh fruit:* all fresh fruit and tamarind products

2 *Protein sources:* all fresh chicken, beef, lamb, mutton, duck, pork, seafood, eggs and nuts

3 *Fresh vegetables:* all fresh vegetables

4 *Fats, oils and seasoning:* all fats, oils, sugar, salt, herbs and seasoning

5 *Processed and manufactured food:* all processed food, snacks, meat and bottled drinks

6 *Carbohydrates:* all rice, wheat, flour, bread products, biscuits, noodles and breakfast cereals

7 *Dairy, cheese and yogurt:* all fresh milk and other dairy products (see appendix table A.1 for more details).

Table 2 shows the results of the survey, in which the average urban household in Fiji spends 568 Fiji dollar (F$) (US$273) per month on food. Processed and manufactured food accounts for approximately 28 per cent of this expenditure, followed by fresh vegetables (22 per cent), carbohydrates (18 per cent), protein sources (14 per cent), fresh fruit (11 per cent), fats, oils and seasoning (6 per cent) and dairy, cheese and yogurt (1 per cent). The protein sources category can be further broken down into fresh seafood 6.6 per cent, other fresh meat 4.4 per cent, eggs 2.5 per cent and nuts 0.4 per cent.

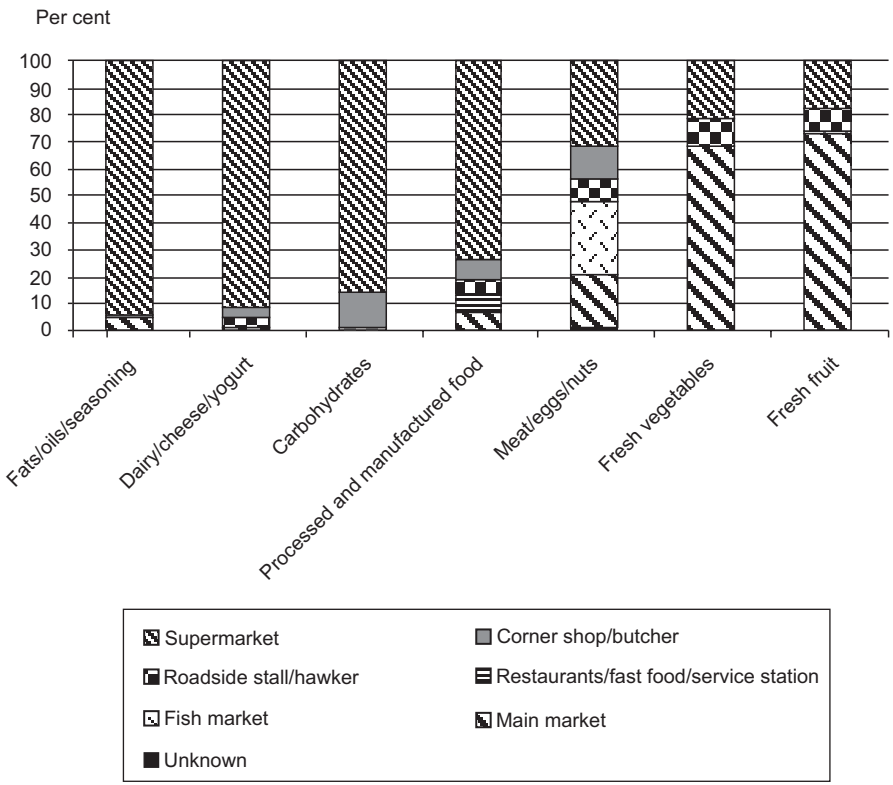
Table 2. Average household expenditure by food groups

Food group	Percentage
Processed and manufactured food	27.8
Fresh vegetables	22.3
Carbohydrates	18.4
Protein sources	13.9
Fresh fruit	10.6
Fats, oils and seasoning	5.8
Dairy, cheese and yogurt	1.2

Source: Authors.

Shopping patterns in the urban locations of Fiji also vary significantly, depending on the food category and type of retailer. Figure 2 highlights how supermarkets lead the processed food categories, while the main traditional markets dominate the fresh produce categories. As expected, the fish market collects a significant share of the protein sources category expenditure (27 per cent), with fresh fish dominating those figures. The specialty stores play a role in the carbohydrates, meat and processed food categories. When the meat category figures are explored in more detail, it becomes clear that butcher shops hold a significant market share in specific products, for example, non-processed pork (57 per cent), beef, lamb and mutton (47 per cent), other meat products (35 per cent), processed meat (20 per cent) and fresh poultry (17 per cent). Similarly, bakeries command 50 per cent of food expenditure for bread and bread products, although their overall share of the carbohydrates category is only 13 per cent.

Figure 2. Share of spending on each food category by type of retailer



Source: Authors.

Based on these results, it is clear that consumers strongly favour supermarkets for most of their processed and manufactured food products, but they choose alternative outlets for the majority of their fresh produce. Onions, garlic and potatoes seem to be the exceptions to this trend. Historically, those products were imported, which probably explains why supermarkets, which can source products through existing importer relationships, dominate the sales of them. In the future, this situation may change for potatoes, whose cultivation by local farmers is actively being encouraged by the Fiji Ministry of Agriculture. If potatoes become a successful local crop, they will join the other popular root crops of cassava, taro, sweet potato and yams. These traditional carbohydrates have a long history as subsistence crops in Fiji (Chandra, Evenson and De Boer, 1976) and are sold mainly through the main traditional markets.

In contrast to the supermarkets, main traditional markets focus much less on processed food products; instead, they tend to dominate the fresh and produce-based product categories. Of the 79 different food products included in the survey, respondents preferred to purchase about 50 per cent from the main traditional market. The vast majority of those products consisted of fresh produce.

The fish markets, along with the main traditional market, account for most of the purchases of fresh fish in Fiji, including tilapia, milkfish, kai, nama and prawns. Processed seafood that is not part of the product offering at traditional markets is predominately sourced from supermarkets.

Roadside stalls/hawkers provide a surprising array of foodstuffs, despite their size. Of the 79 products included in the survey, only four were not featured in the responses of those household consumers who frequent roadside stalls/hawkers. These outlets ranked second behind supermarkets for the sale of poultry (20.1 per cent), and are popular for other products, such as fresh milk, eggplant, rourou (a local green leafy vegetable), brassica (cabbage, cauliflower, broccoli and Brussel sprouts) and certain types of seafood (fresh tilapia and fresh water prawns). Roadside stalls/hawkers are the most popular retail outlet for kava (35.9 per cent), a culturally significant drink that is consumed in “kava bars”. The drink, which is popular across the Pacific islands, is made from the roots of the yaqona plant and has a sedative and calming effect.

Corner shops, butchers and bakeries, which are modern innovations, provide a variety of different types of food products. If it is assumed the butcher and bakery visits were predominantly for meat and bread products, respectively, then the results suggest that corner shops represent an alternative to the major suppliers for certain processed and fresh products. Although the percentages of purchasing at this type of outlet were low, corner shops represented a retail option for processed products,

including spreads (7.7 per cent), alcoholic beverages (7.7 per cent), snacks (7.2 per cent), soda (7.2 per cent), other dairy products (3.9 per cent), breakfast crackers (3.5 per cent), chocolate and sweets (3.5 per cent) and noodles (3.2 per cent).

The remaining retail outlets (restaurants, service and fast food stations) collectively account for only 2 per cent urban food expenditure in Fiji, but it will be interesting to see whether consumer preferences for these modern outlets change over time if socioeconomic conditions continue to improve.

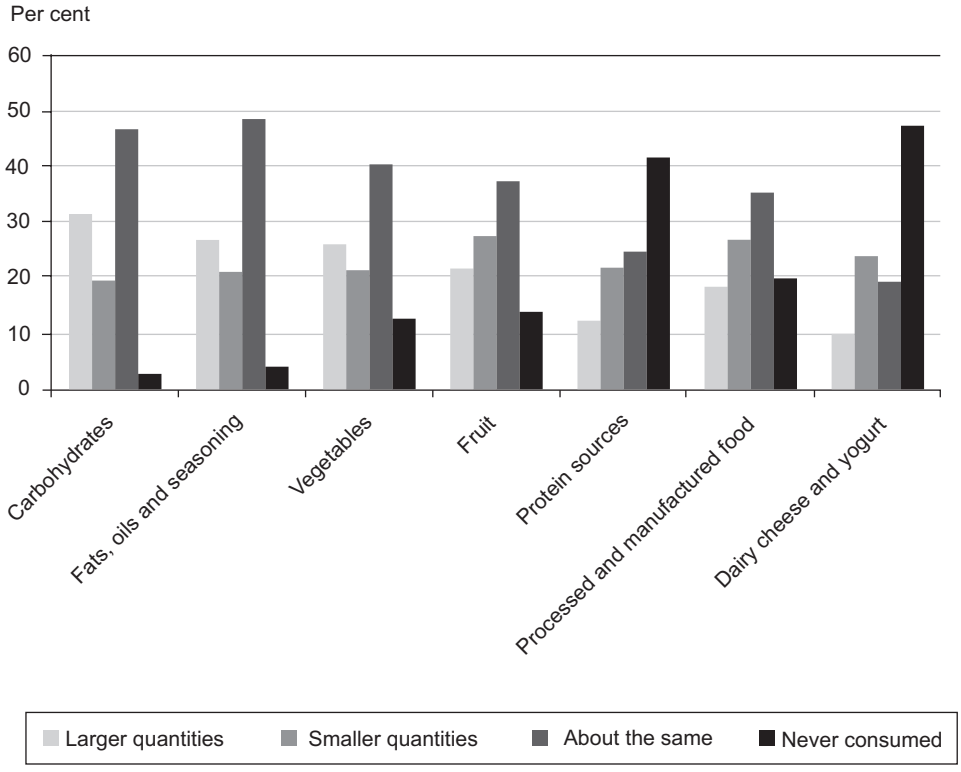
Changes in consumption

Respondents were asked to estimate how their household consumption of each of the 79 food categories had changed over the previous five years. In the absence of baseline data, the basis used was respondents' estimates of whether their household had consumed larger quantities, smaller quantities or "about the same" amounts compared to 2007. Again, to analyse the results, the food products were aggregated into seven core food categories (see appendix table A.1).

As illustrated in figure 3, a significant proportion of the respondents said they had either maintained their consumption level or did not eat the product in the first place. For those who did shift their consumption during that period, it appears that the food categories of "carbohydrates", "fats, oils and seasoning", and "vegetables" grew the most.

More respondents reported reducing rather than expanding their consumption of processed food products over the previous five years, along with fruit, protein and dairy. While a reduction by households in their consumption of processed food was not expected, in the period 2007-2012, a number of national and global changes took place, which were expected to have had an effect on expenditures for this category. This period was associated with a rise in global food prices along with the global financial crisis in 2008 (Brinkman and others, 2010). In April 2009, the Fiji dollar was depreciated by 20 per cent (Narayan and others, 2012) and although the real effective exchange rate (REER) recovered by 2012 (Gottschalk and others, 2016), the depreciation was a key factor behind an increase in the price of imported food products. As 79 per cent of processed food products sold in Fiji are imported (Snowdon and Thow, 2013), these changes appeared to have had an influence, particularly in comparison to a large number of essential local food items, which were under price control and are value-added tax (VAT) exempt. Sugar sweetened beverages are one of these imported processed products for which an import tariff has been applied since 2006 (Snowdon and Thow, 2013). These observations highlight the advantages of refining and repeating the survey in the future to allow for more meaningful comparisons and a longer-term analysis of trends.

Figure 3. Subjective estimates of respondents of changes in household food consumption

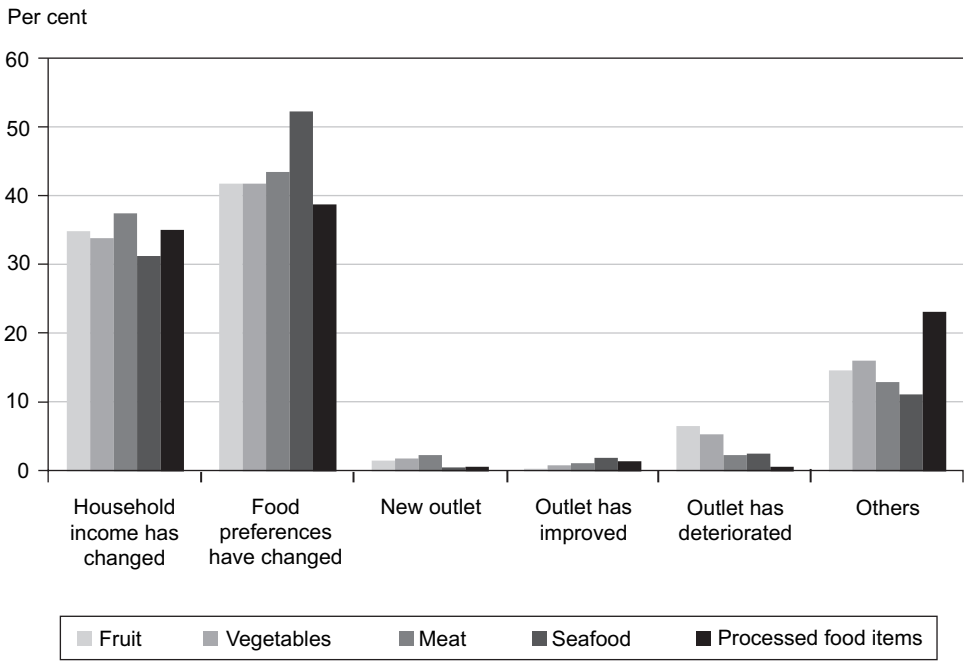


Source: Authors.

A cross-sectional subset of 21 food products split into five food categories (see appendix table A.2) was investigated in more detail by asking household consumers why their purchasing habits for those products had changed in the previous five years. Figures 4 and 5 illustrate that the primary reasons given were a shift in household income and changing food preferences. These two reasons dominated the responses across the six food categories, with more than 70 per cent of households indicating income or food preferences were the driving force behind the behaviour change, whether it resulted in an increase or a decrease in consumption.

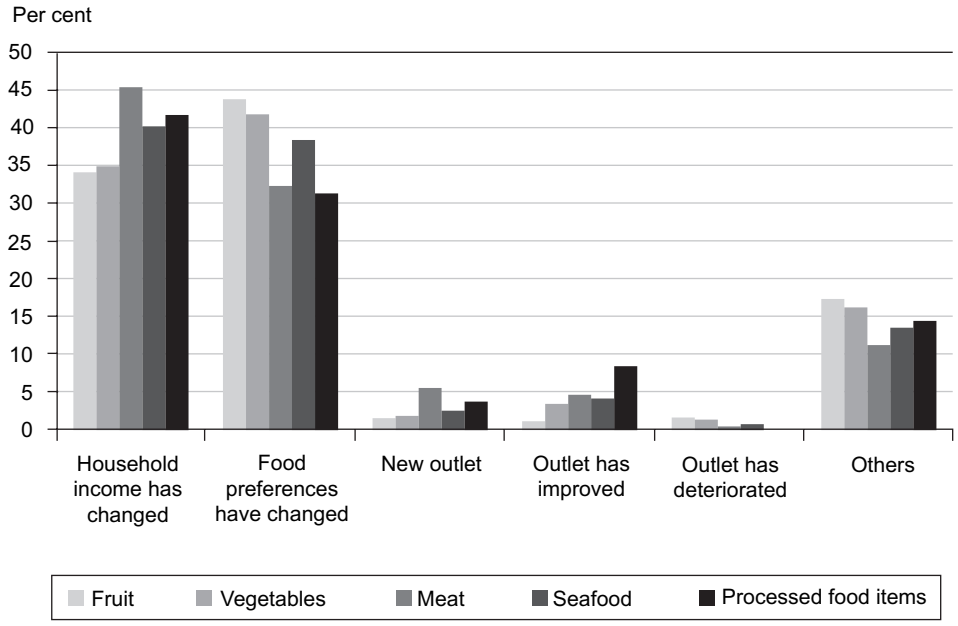
Analysis of household characteristics demonstrates that the standard of living of the vast majority of households surveyed (>90 per cent) has either remained the same or improved over the five-year period. Of those who said their standard of living had improved, 39 per cent reported a slight improvement (by 10 to 20 per cent overall), while 22 per cent reported a significant improvement (>30 per cent). Rising income allows the household to buy a wider range of products. However, increasing disposable income may be the result of extra work, which can affect time availability and increase the importance of convenience as a factor in the choice of both food products and retail outlets (Jabs and Devine, 2006).

Figure 4. Primary reason the purchasing habit of consumers has shifted to smaller quantities



Source: Authors.

Figure 5. Primary reason purchasing habit of consumers has shifted to larger quantities

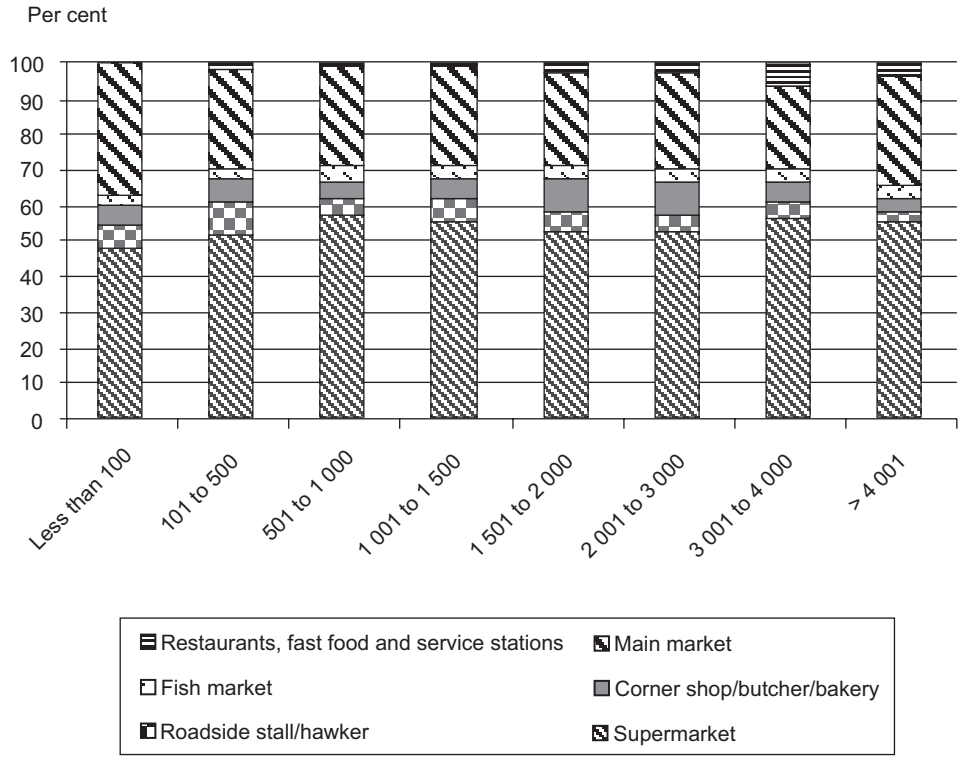


Source: Authors.

Food expenditure across different income levels

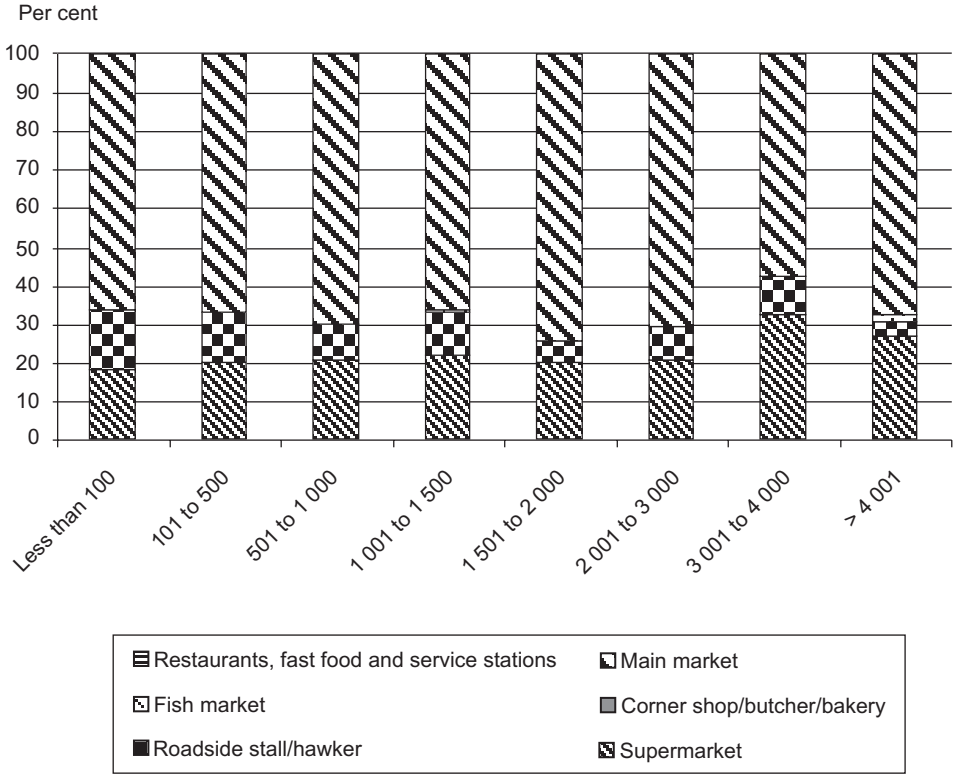
Figure 6 highlights how food expenditure varies little across the eight income levels. While this seems to contradict research from a number of other developing countries, parallels exist in East and Southern Africa (Tschirley and others, 2015) and Kenya (Neven and others, 2006). The Kenyan case study looked at food purchasing patterns across food categories and retail outlets, and found that 60 per cent of the poor and low income groups living in Nairobi bought some of their food from supermarkets (Neven and others, 2006). When low-income consumers in Kenya were asked why they shopped in supermarkets, the survey results showed that they found supermarkets cheaper for processed food and close enough to home to make the trip worthwhile (Neven and others, 2006). In the example of Kenya, researchers noted that modern retailing had penetrated the processed food category first to capture 20 per cent of urban food retailing, but only 4 per cent of the fresh fruit and vegetable category (Neven and others, 2006).

Figure 6. Share of food spending at different retail outlets by decile of per capita expenditure (F$)



In figure 7, only data for household expenditures on fresh fruit and vegetable are presented. What stands out clearly is the dominance of the main market for sales of fresh fruit and vegetables across all income levels. If those figures are averaged, the main market enjoys a 69 per cent market share of fresh fruit and vegetables food expenditure. While expenditure is still fairly even across the income levels, supermarkets appear to gain more market share in the two higher income levels, columns 7 and 8. This suggests that higher income earners may be switching more of their fresh fruit and vegetable shopping to supermarkets, which may be because of insufficient time for multiple-outlet shopping.

Figure 7. Share of fresh fruit and vegetable spending at different retail outlets by decile of per capita expenditure (F$)



V. DISCUSSION

Responses to a novel household survey show that consumers in the main cities of Fiji patronize an array of different food retail outlets. However, 82 per cent of the urban food expenditures in the country are shared between supermarkets and traditional main markets. The fact that more than 50 per cent of urban food expenditure in Fiji are now spent in supermarkets is highly significant, particularly considering that the country was historically a traditional-market food economy. While not ideal for comparative purposes, a study investigating the share of trade in rapidly moving consumer goods in several developing countries found that modern retail outlets accounted for less than 50 per cent of total expenditures (Nielsen, 2007). The countries included Malaysia (48 per cent), Thailand (45 per cent), Philippines (43 per cent) and Indonesia (35 per cent). All have had far greater foreign investment into

modern food retailing, and would be considered significantly more developed than Fiji. Another study in the Philippines two years later confirmed that supermarkets had expanded their share of urban food expenditure to 45 per cent (Romo, Digal and Reardon, 2009). A similar study in China showed that between 1999 and 2009, urban food expenditure in supermarkets increased from 30 per cent to 48 per cent (Reardon and Timmer, 2007; Stringer, Sang and Croppenstedt, 2009).

When net inflow figures for foreign direct investment are compared for those countries, it is clear that Fiji, at $0.27 billion, in 2013 is well behind the other more developed countries, such as the Philippines ($3.66 billion), Malaysia ($9.73 billion), Thailand ($10.69 billion), Indonesia ($19.62 billion) and China ($295.63 billion) (World Bank, 2013). Comparisons with other more developed countries highlight why understanding the "demand pull" drivers of retail transformation in Fiji is so important; precisely because the usual "supply push" of foreign investment has not been the principal engine of change.

The level of urban food expenditure in supermarkets is even more impressive considering that the increased cost of imported food over this five-year period, and its impact on disposable income, may have induced slight reductions in consumption of processed food by the average household. At the same time, however, the trend towards shopping at supermarkets has not resulted in households moving their expenditures away from the main traditional market to a significant extent. Instead, urban inhabitants in Fiji tend to patronize supermarkets and the main market to meet their food shopping needs. In a general sense, supermarkets offer a full range of food products, but dominate the sales in the processed food category, while the traditional main market is still the preferred choice for fresh produce, such as fresh fruit, vegetables and certain types of meat.

While expenditure at the supermarket did not vary greatly across different income levels, higher income households tended to spend more on fresh fruit and vegetables at the supermarket.

The remaining 18 per cent of urban food expenditure is shared between roadside stalls/hawkers, fish markets, specialty stores, restaurants, and fast food and service stations. While roadside stalls/hawkers only had a 6 per cent share of total food expenditure, their range of products is impressive. This variety coupled with their proximity to households enables them to compete with the supermarkets, while their connection to local farmers and the freshness of their produce compares well to the main traditional market. This combination of the best of both the modern and traditional outlet traits may stand them in good favour with consumer preferences for some time to come.

With the benefit of hindsight, it would have been prudent to separate the retail outlets of corner shops, butchers and bakeries. They are all examples of more modern retail outlets, and collectively account for a relatively small percentage of the total urban food expenditure (6 per cent). However, they deal in specialty products (meat and bread), which would have given greater clarity to the results had they been kept separately.

The other modern food retail outlets in Fiji (restaurants and fast food and service stations) together account for a mere 2 per cent of total food expenditure, with 78 per cent of urban households patronizing those outlets a few times a year at most. This suggests that those outlets survive mainly on tourists.

VI. CONCLUSION

The research shows that consumer preferences and changing urban household income are key drivers for food purchasing habits in Fiji. This has resulted in households spending more than one half of their food budget at supermarkets. In contrast to other developing countries experiencing a "supermarket revolution", there has been limited investment in Fiji in food retailing, which highlights the strong role consumer preferences may have had in shaping food shopping patterns.

If household income or investment into supermarkets were to increase in the future then previous studies in developing countries have indicated that the supermarket share of food expenditure would also continue to rise (Alvarado and Charmel, 2002; D'Haese and Van Huylenbroeck, 2005; Reardon and others, 2003). Further studies have shown that additional supermarket growth can involve a shift from the processed food category into the fresh produce area (Brown, 2005; Neven and others, 2006). Considering that smallholder farmers currently rely on traditional market channels to sell their fresh produce, shrinking of these traditional markets would have significant implications for them. Furthermore, if smallholder farmers are affected, then these changes raise broader concerns about the livelihoods, health and food security of the people of Fiji, which is of vital interest to local government departments and donor development agencies.

However, the future of the food industry in Fiji is far from clear. While higher income level households are showing some early signs of purchasing small amounts of fresh fruit and vegetables from supermarkets, 97 per cent of households are still shopping at the traditional main market, indicating that the competition for the fresh produce category is only in its infancy. There is also a body of research showing that traditional food retail outlets cannot only hold their market share but compete fiercely with modern supermarkets to retain their dominance in the fresh produce category

(Cadilhon and others, 2006; Humphrey, 2007). For this reason, it is important that these types of studies and surveys on consumers are repeated to better understand how these changes are affecting the whole value chain and what can be done to ensure that local farmers and the local economy are not being detrimentally affected.

Policy attention will need to be directed towards further investigation of how smallholder farmers can integrate into supply chains, which are growing as a result of changing consumer food and shopping preferences. These insights will also be vitally important for private sector and donor agency stakeholders trying to predict the future constraints and opportunities within the Fiji food system. While Fiji is a special case study in itself, it is also hoped that this type of research will provide insights for other small island developing countries that are experiencing similar global pressures.

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APPENDIX

Appendix table A.1. Aggregation of food products into seven core food groups

Fats, oils and seasoning	Dairy, cheese and yogurt	Carbohy-drates	Processed and manufactured food	Protein sources	Fresh vegetables	Fresh fruit
Cooking oil, vegetable oil, canola oil, etc.	Fresh milk	Rice	"Other" milk	Chicken not processed	Eggplant	Pawpaw
Sugar and salt	Other dairy	Wheat and flour	Spreads	Beef, lamb, mutton not processed	Mushrooms	Banana
Herbs and seasoning		Bread and bread products	Snacks	Duck not processed	Assorted beans	Lemon
		Noodles	Chocolate and sweets	Pork not processed	Ota	Mango
		Breakfast crackers and other biscuits	Chili sauce	Other meats	Brassica/ cabbage	Melon
		Breakfast cereals	Coffee, milo, tea	Eggs	Rourou	Pineapple
			Alcohol	Nuts	Other leafy vegetables	Papaya
			Kava	Fresh tilapia	Tomato	Apple
			Bottled water	Fresh nama	Capsicum	Orange
			Soda	Fresh water prawns	Broccoli	Grape
			Coconut milk	Fresh milkfish	Celery	Breadfruit
			Ready-to-eat meals	Fresh kai	Lettuce	Coconut
			Processed or frozen fruit	Other fresh seafood	Cucumber	Other fruit

Appendix table A.1. ***(continued)***

Fats, oils and seasoning	Dairy, cheese and yogurt	Carbohy-drates	Processed and manufactured food	Protein sources	Fresh vegetables	Fresh fruit
			Processed or frozen vegetables		Carrot	Tamarind paste
			Processed meat (sausages etc.)		Chillies	Other tamarind products
			Processed seafood		Okra/bhindi	
					Cassava	
					Taro	
					Sweet yams	
					Potato	
					Onion	
					Garlic	
					Ginger	
					Other vegetables	

Appendix table A.2. Subset of 21 food products aggregated into five food categories

Fruit	Vegetables	Meat	Seafood	Processed
Breadfruit	Lettuce	Fresh meat and poultry	Tilapia (maleya)	Processed food items
Tomatoes	Capsicum		Nama caulerpa (sea grapes)	
Melons	Eggplant		Fresh water prawns (ura dina)	
Other fresh fruit	Brassica		Milkfish (yawa)	
	Taro		Kai	
	Cucumber		Other fresh fish and seafood	
	Beans			
	Other fresh vegetables			

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