

International Trade Structure and Labour Share: Industry level Analysis in India, China and Japan.

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Abstract

Trade and Globalisation have intensified demand preference for quality labour and helped in improving productivity mainly in emerging countries. This has led to a significant change in the composition and structure of the economy, and also the trade structure. In this context, this study examines the impact of economic integration through trade openness and financial integration on the labour income share in India. The study addresses this issue by analyzing both the aggregated data and KLEMS disaggregated industries during the period from 1980-81 to 2015-16. The findings show that trade openness and financial integration, and TFP are significant in explaining labour income share in the total economy. These findings are confirmed from the disaggregated industry-level analysis in 1995-2015. The results are compared with the People's Republic of China (PRC) as an emerging country and Japan as a developed country in Asia.

Keywords: Globalization, Emerging economies, labour share, productivity, ARDL, System-GMM

JEL Classifications: F02; F06, F43; R11; R12; L1

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1. Introduction

The studies on functional income distribution identified that there have been considerable changes in recent decades. There has been a symptom of declining labour share in national income in recent years in various countries (Elsby et al. 2013; Karabarounis and Neiman 2013; Stockhammer 2015; IMF 2017). The labour income share has been falling in most of the developed countries, developing and emerging countries (Dünhaupt, 2013). In particular, there is about a 20 % decline in the labour income share in Asian developing countries (Doan and Wan, 2017).

The labour income share is a crucial factor for domestic consumption and income inequality. The distribution of labor income is more even than that of the capital income (Daudey and Garcia-Penalosa 2007; Garcia-Penalosa and Orgiazzi 2013; Jacobson and Occhino 2012). The capital income is identified as the crucial factor of rising inequality (Piketty, 2014 and Atkinson, 2009). The downward trending of labor income share is associated with the current trend of globalization, which began in the early 1980s. The existing literature analysed the globalization effects on income inequality, in the developing countries (Goldberg and Pavnik, 2007), in India (Mallick 2018; Topalova 2007) and China (Wan et al. 2007; Xue et al. 2014). The stability of functional income distribution has been considered as a “stylised fact of growth” (Kaldor 1961). It is thus policy imperative to explore the role of globalization in a downward trend of labour income share in the developing and emerging countries.

Trade and Globalisation have intensified demand preference for quality labour, that embodies knowledge and skill to enhance production capacity in one hand, and on the other hand, it has changed lifestyle and consumption behavior of the society. Consequently, this has led to a significant change in the composition and structure of the economy, and also the trade structure. The trade affects both the product market and labor market conditions through the channels of market size, competition, and specialization (see Neary, 2016). Trade reform measures are a crucial part of the major reforms undertaken in India in the early 1990s. After the independence, the Indian economic growth was moderate until 1965 followed by the slowdown until the early 1980s. The slowdown was due to the presence of various inefficiencies and rigidities faced by the economy. The economy started facing high inflation,

high unemployment rate and low foreign reserves along with slower economic growth. Hence, India initiated the liberalisation measures in the middle of 1980s and took the drastic reform measures in 1990s. In the process, trade barriers were slowly removed, the licensing system was gradually phased out, and private investment was allowed in various core economic activities, and so on. Under the assumption that the removal of these barriers would promote trade and thus improve competition, raise efficiencies and reduce rigidities in the product and labor markets.

With this backdrop, the paper aims to examine the impact of economic integration through both the trade openness and financial integration on labor income share in the largest emerging countries India and compares its experience with the People's Republic of China (PRC) and Japan. The research questions are twofold. First, how global economic integration affects labor income shares at the aggregated level? Second, how global economic integration affects the labour share at the disaggregated industry level?

This study contributes to the existing literature in various ways. First, we analyse the impact of global economic integration at the aggregated economy. Second, we also estimate the impact of financial integration, and trade integration through trade openness and offshore by considering 27 industry of an economy following India KLEMS classification. This analysis is new as no study uses 27 industries of KLEMS in dealing with trade openness and offshore in the context of India and the PRC.

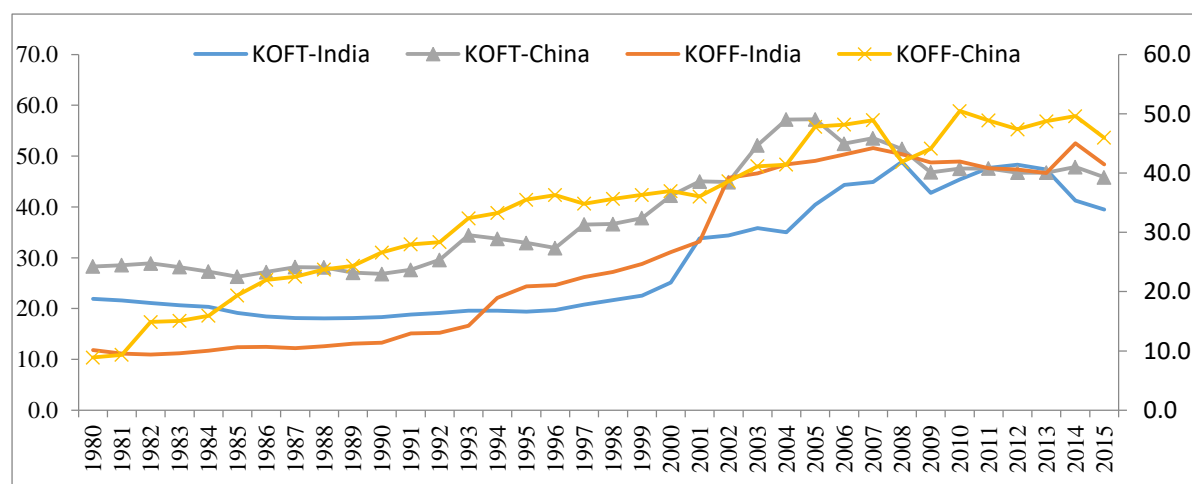
The rest of the paper is organized as follows. Section 2 provides a discussion on the economic integration, and trade structure at the macro level as well as industry levels in India, and compares it with the largest emerging country, China. The patterns of labour income share and productivity in the total economy and industries are presented in section 3. Section 4 discusses the theoretical perspectives on the factors of labour income share. Empirical methodology and data are provided in section 5. Section 6 presents the results from the empirical analysis in India and compares with the PRC and Japan. The findings and conclusions are provided in the last section.

2. Trends of Global Economic Integration in India and the PRC

Globalization is a broad concept, which has several components including economic integration, social globalization and political globalization Gygli et al., (2019). Economic globalization constitutes financial integration and trade integration. The earlier component comprises foreign direct investment (FDI), portfolio investment, international debt,

international reserves, and international income payments, whereas the latter one is defined to include trade openness and trade diversification. In this paper, we focus on trade openness, which is the major component of economic globalisation. There is significant progress in trade openness in India since the middle of the 1990s (see, figure 1), it was far behind China until 2008, the year of global financial crisis which started in September 2007 and persisted until 2011. Since then the gap in trade openness between these two countries has declined. Similarly, both countries were at an equal level of financial integration in 1980. Due to the aggressive policy reform, the degree of financial integration has significantly increased in the PRC from 1980 to 2002, by which a large gap has emerged between India and the PRC. This gap is reduced since the middle of the 1990s due to the financial reform measures taken by the Indian Government.

Figure 1. Trends of global economic integration



Source: Gygli et al., (2019)

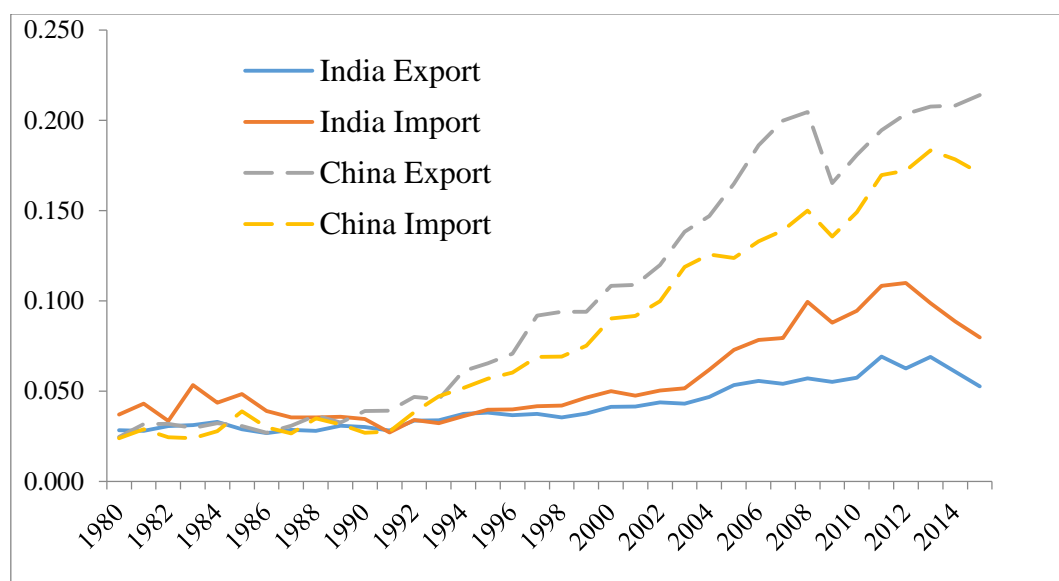
In this study, we focus on the trade openness part economic integration. In the rest of this section, we provide the trend of export and import at the aggregated level and industry level in India and the PRC.

2.1. Patterns of export and imports

India has been traditionally a trade deficit economy. Its income is mainly contributed by the domestic demand. As in figure 2, India's import was about 10 percent in 1980 and its export was 6 percent in that period. Due to the trade liberalization as a component of the broad economic reforms in the 1990s the import and export has grown from 1992. The drop in both the import and export in 2009 and post-2012 are due to the global financial crisis and the global economic crisis, respectively. In contrast, the PRC has been a trade-driven economy,

which has been enjoying the trade surplus. The import and export share in national income in the PRC is significantly higher than that of India until 2009.

Figure 2. Share of Export and Import share in GDP



Sources: PWT 9.1 Database

2.2. Patterns of export and imports at the disaggregated industry level

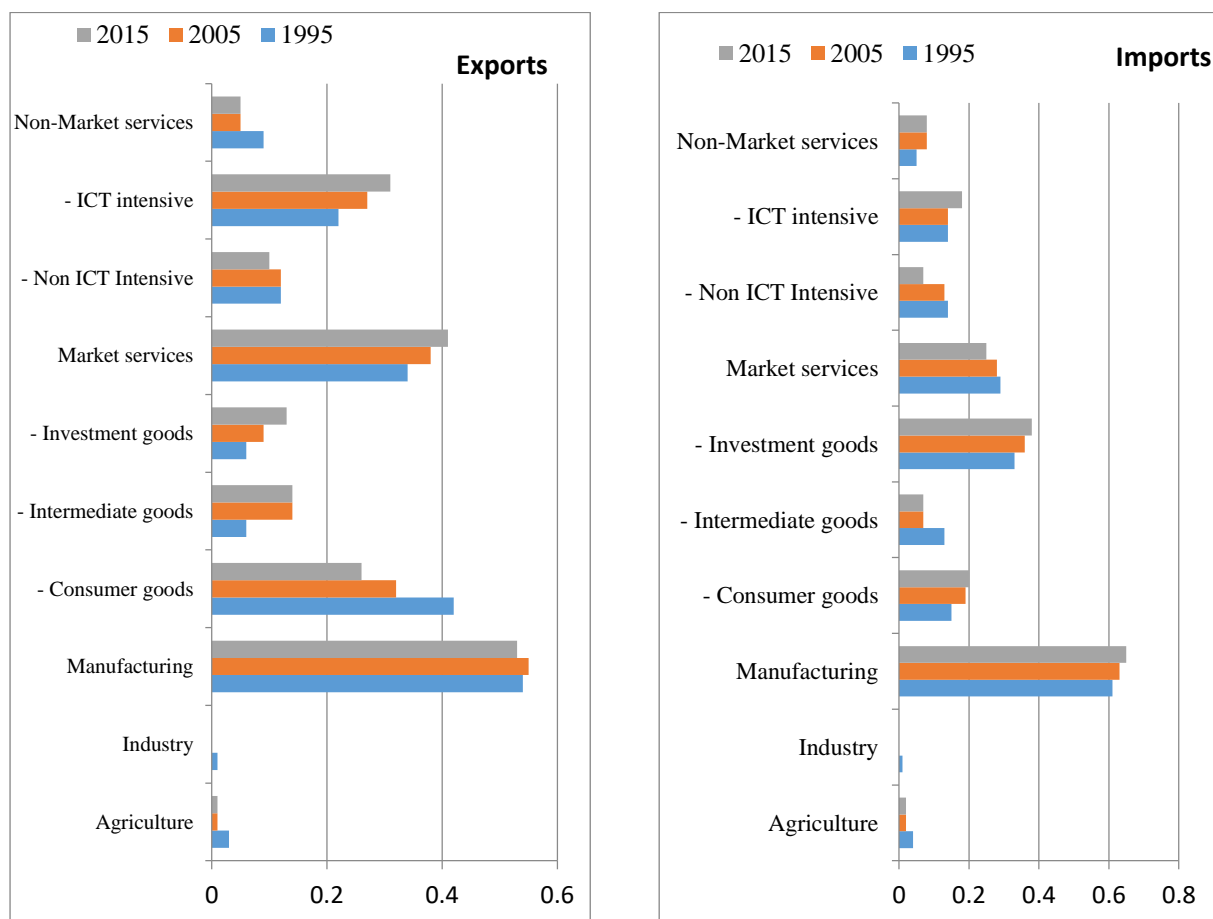
The 27 industries classification of India KLEMS is used as the benchmark for the analysis in these two countries. The sectoral level data on export and import from the TiVa database of OECD versions 2016 and 2018 are used. The concordances of 27 industries of India KLEMS with TiVa of OECD 2016 and 2018 are presented in Table A1 in appendices. The sectoral share of exports and imports are provided in Table A2 and A3 in appendices. Further, these 27 sectors are grouped into eight categories based on Krishna et al. (2017). They are agriculture, industry, consumer goods, intermediate goods, investment goods, non-ICT intensive market services, ICT-intensive market services and non-market services.¹ We present the patterns of exports and imports in the eight categories of industries as below.

There has been a change in the structure of India's export basket from traditional items to modern goods and services. This has happened because of industrialization and measures of trade liberalization in the 1990s. As seen in figure 3.a. the share of market services particularly the ICT intensive services in the export basket of India has been increasing. Interestingly, the share of consumer products of the manufacturing industries was the predominant sector in the export basket that has been declining continuously from 0.42 in

¹ The detailed concordance is given Table A2.

1995 to reach 0.26 in 2015. The intermediate goods and investment goods of the manufacturing each were 0.6 in 1995, they have increased to 0.14 and 0.13 respectively in 2015.

Table. 3.a. Share in export and imports of final goods at the industry level, India



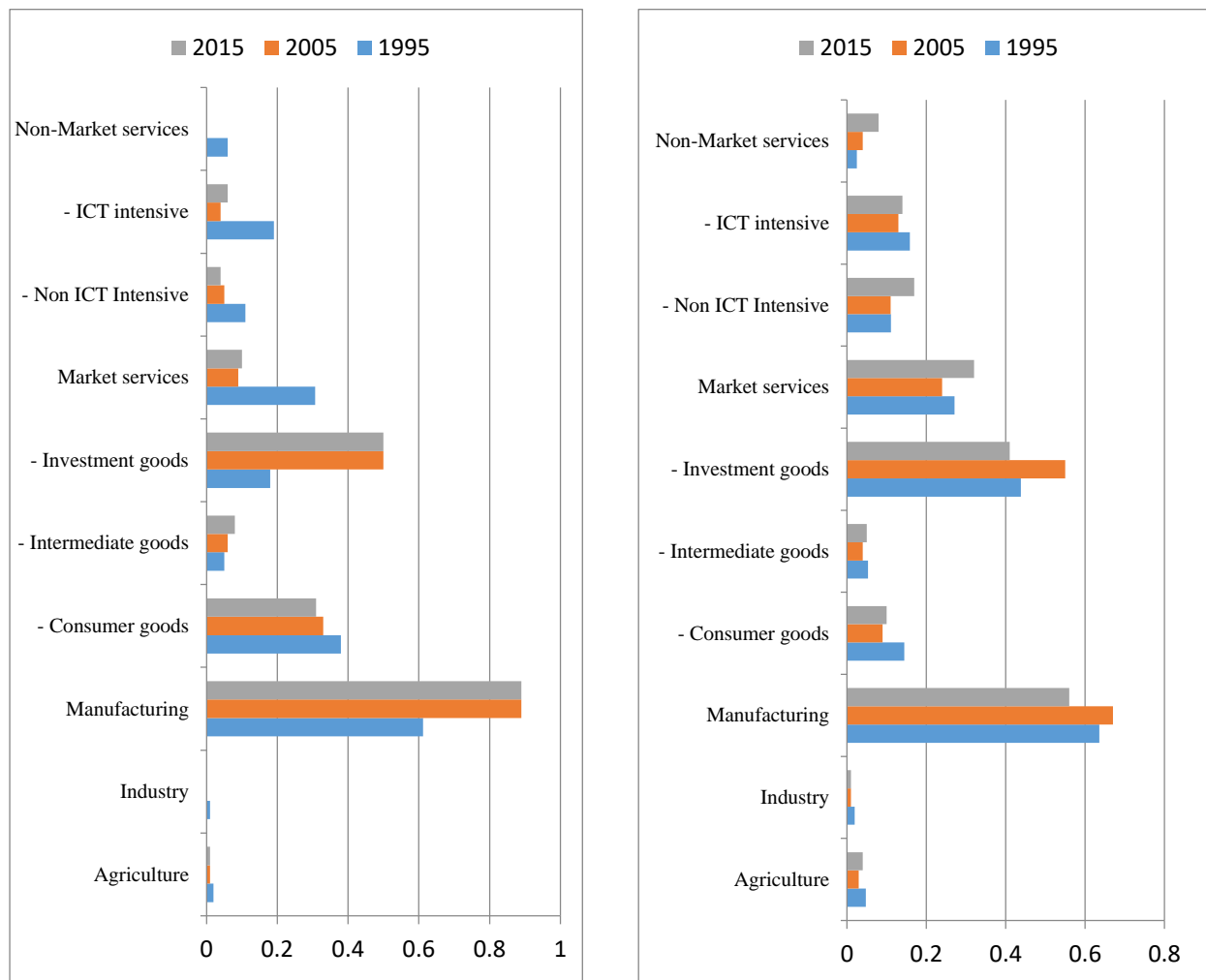
Sources: OECD TiVa (2016; 2017)

The imports of agricultural and industrial products have been declined over the years. In contrast, the manufacturing imports have increased, which is contributed from both the consumer goods and investment goods. As regards the market services, the imports have been decreasing in opposite its increasing trends in exports. This is important to notice that the huge growth of export of ICT-intensive services is accompanied by a rising trend in imports during the period from 1995-2015. The import of non-market services increased marginally from 0.05 to 0.08 in 2015.

This is well accepted that manufacturing export is the driver of the sustained huge economic growth of the PRC, which is evident from figure 3.b as well. The manufacturing export has jumped from 0.61 to 0.89. The gain in the manufacturing export is at the cost of

both market services and non-market services. The imports of manufacturing increased marginally from 0.64 in 1995 to 0.67 in 2005 and declined to 0.56 in 2015. There is an increase in both the market services and non-market services imports during the period in 1995-2015. Due to high economic growth once the per capita income is raised the PRC has started to consume the imported services.

Fig.3.b. Share in export and imports of final goods at the industry level, the PRC



Sources: OECD TiVa (2016; 2017)

3. Labour income share and productivity

This section provides a brief description of the patterns of labour income share and TFP to understand their relationship in India and the PRC.

3.1. Patterns of Productivity and labour income share

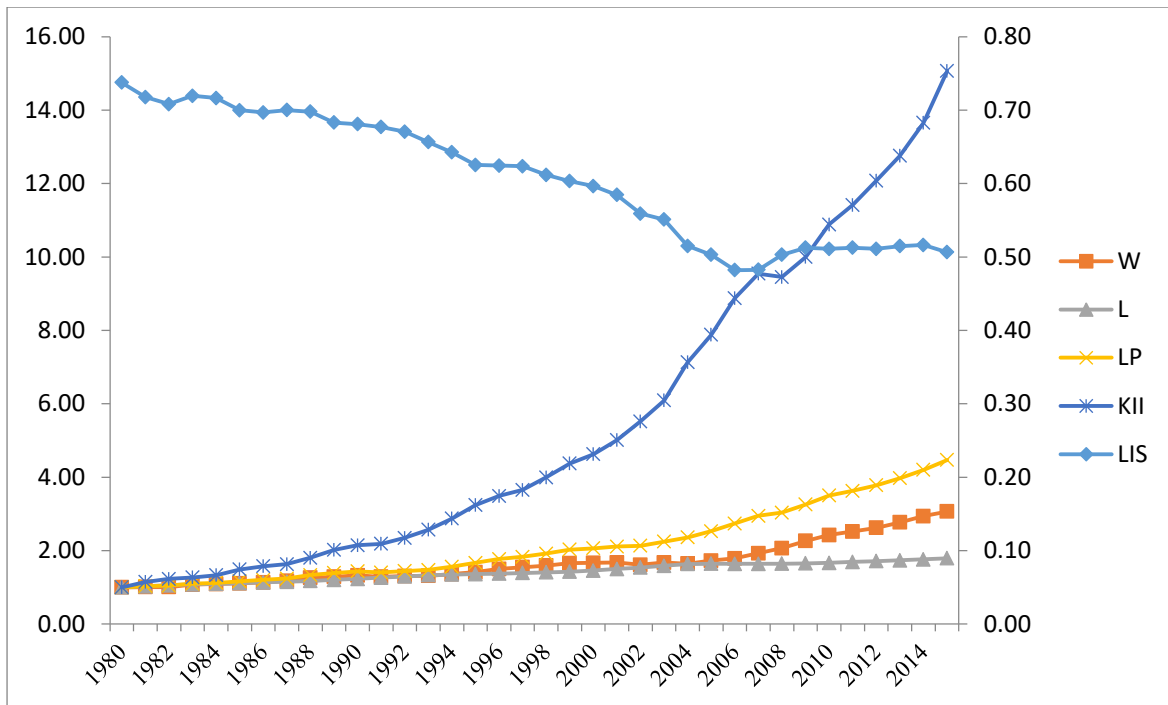
The trend in labour share is driven by two factors. They are the growth of wage and growth of employment. In a perfectly competitive market wage is driven by labour productivity. In general, the labour share increases if an increase in wage is more than that of labour

productivity. Conversely, if the growth in average wages is less than the labour productivity growth, this leads to a decline in the labour income share. In the below, we provide indices of wage, employment and labour productivity which the reference year 1980 (=1), and the labour income share in India and the PRC in figures 4a and 4b. The labour income share of the total economy in India has declined significantly from the middle of the 1980s. We notice in the case of India that during the period in 1980 to 2015 the real wage has increased by two times, and employment has increased by 0.8 times. In contrast, labour productivity has increased by 3.5 times. Though the employment has increased the real wage rate has not grown with labour productivity. That means the wage growth significantly lagging of the labour productivity growth results in the declining labour share in India. The informal sector in India is the largest in the world, which is obvious that its workers receive lower wages, alongside, being the formal part of the labor market in India is highly rigid. Recently, the reform measures have begun to remove the laws related to the rigidity (Bhattacharjea, 2018).

The declining trend of labour income share is associated with a faster rate of trade integration as we discussed in the previous section. The international trade facilitates the resources allocation and affects both the product and factor markets. This results in changes in the payments and thereby the factor share. It is argued in the literature that trade weakens workers' bargaining power (Neary, 2016).²

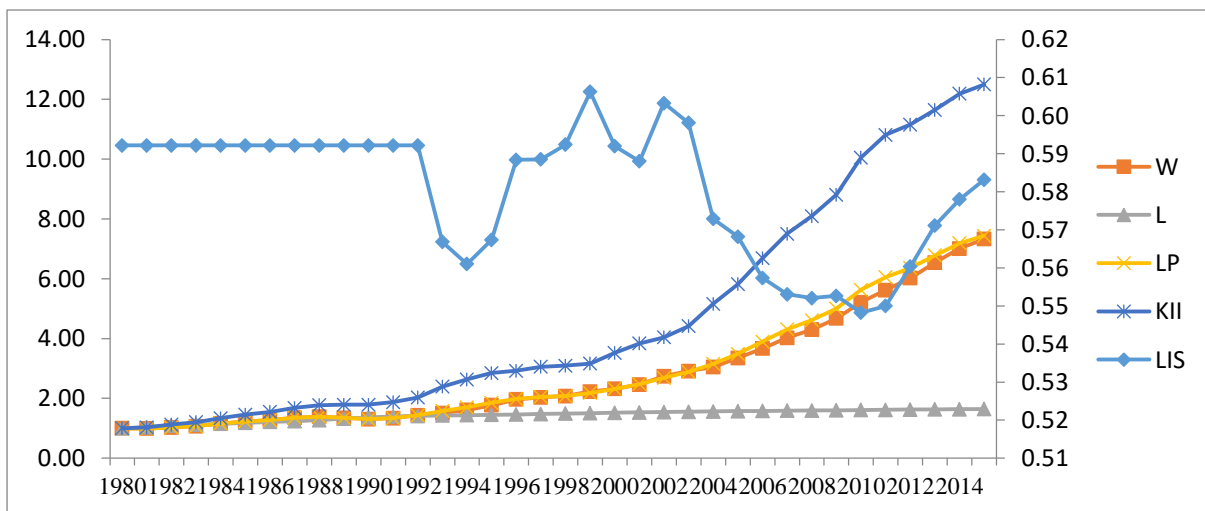
Fig 4.a: Productivity and labour income share in India

² The reason is that the specialization effect due to the differences in productivity between the trading partners dominates over the combining effects of competition and market size because of heterogeneity of firms.



Note: W: wage index, L: labour index, LP: Labour productivity index, KII: capital income index, LIS: labour share
 Source: Penn World Table 9.1

Fig 4.b: Productivity and labour income share in the PRC



Note: W: wage index, L: labour index, LP: Labour productivity index, KII: capital income index, LIS: labour share
 Source: Penn World Table 9.1

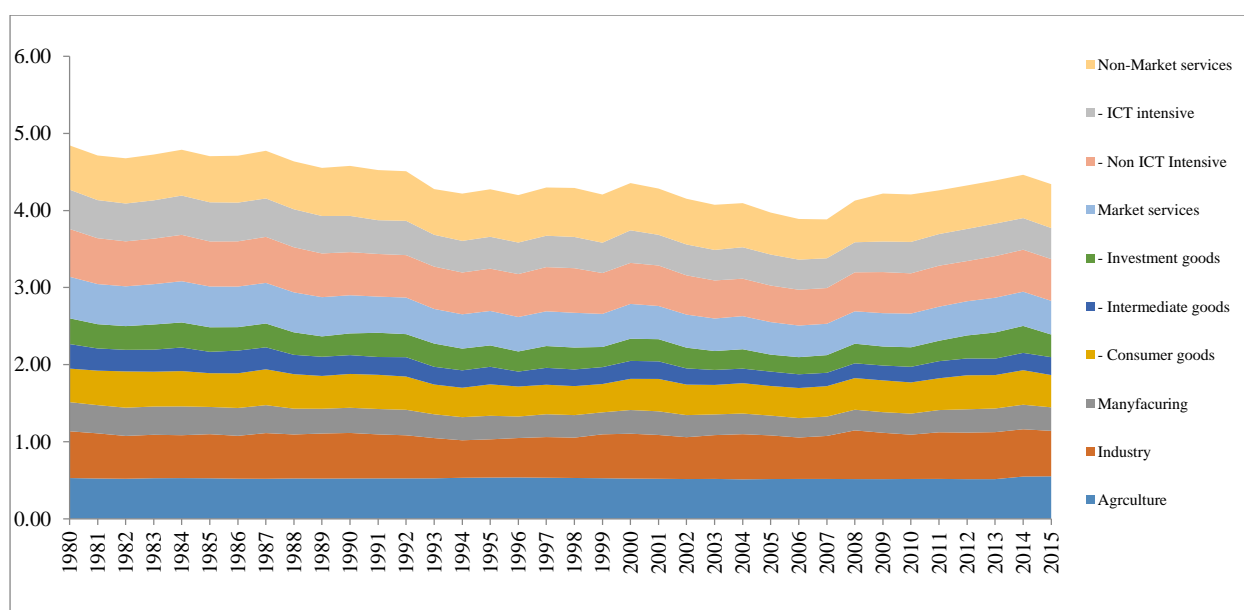
We can see that the decline in labour share during this period in the PRC is not as big as in the case of India. Employment has increased by 0.8 times, and the wage rate has increased by 6.5 times. The wage rate and labour productivity have been also moving concurrently. Still, there is a declining trend of the labour income share. That means the declining labour share is mainly due to the rising capital income.

3.2. Labour income share and productivity by industries

In this sub-section, we provide a discussion on the drivers of labour share by industries in India and the PRC. We aggregate 27 industries into 8 categories. They are the agriculture, the rest of industries, consumer goods, intermediate goods, investment goods, non-ICT services, ICT services, and non-market services.

Figure 5a shows that the labour income share in the agriculture sector in India has a declining trend until 2013, which has recovered in recent years. It is also observed that manufacturing experiences a declining trend, which could be due to the huge rise in capital income and a minimal number of high-wage employees in this sector. There is a stable labour share in the rest of industries and market services. The rest of the industries include the mining and quarrying, utility and construction activities. There is a consistently declining trend of labour share in the mining and quarrying, and construction during this period. In the case of utility, the labour share faces declining trend until 1994-95. This was 0.38 in 1980-81 and declined to 0.19 in 1994-95. Since then, this trend has reverted and become 0.36 in 2015. Further, all three types of manufacturing industries and the two types of services have shown declining trends during this period in India. The non-market services has experienced an increasing trend in the 1980s, and a declining trend after 1991. In the below, we explain the trend of labour share in the industries through the trend of growth of labour, real wage rate, and labour productivity.

Fig.5.a Labour income share by industries (India)



Source: India KLEMS Version 2019

The table 1a gives the reason behind the trends of labour share in various industries. The employment index has increased by 0.19 times in 1995 and subsequently 0.26 times relating to the reference year 1981, before the change in index becomes 0 in the year 2015. There has been a parallel change of real wage index with the labour productivity index. These changes in the real wage rate in the years in 1995, 2005 and 2015 relating to the year 1980 exactly match with the changes in labour productivity in these years. This results in a more or less stable labour share in the agriculture sector in India. The rest of the industries experienced huge growth in employment, while the real wage rate and labour productivity have not grown. Due to rising capital income, the labour share in this industry has not increased.

As regards the manufacturing sector, there is a growth of employment in consumer goods industries and the real wage rate and labour productivity have grown evenly. The declining trend of labour share in this sector is due to the rising capital income in the national income. In the case of the intermediate goods, there is a growth of employment but the growth of the real wage rate is lagged behind the labour productivity growth during this period. The rising capital income is also the reason for the significant decline in the labour share in this industry. Like the consumer goods industry the investment goods has also experienced the growth of employment and even growth of real wage and labour productivity. Hence, the declining labour share in this industry is due to the rising capital income. This is interesting to observe that there is the growth of employment, and the growth rate of wage rate exactly match with that of labour productivity in the non-market services. The labour factor is supposed to increase the labour share, but the higher growth of capital income neutralize the positive effect of the growth of employment and wage rate, which results in a stable labour share during this period in this industry in India.

Table 1.a. Indices of labour, real wage rate and labour productivity (India)

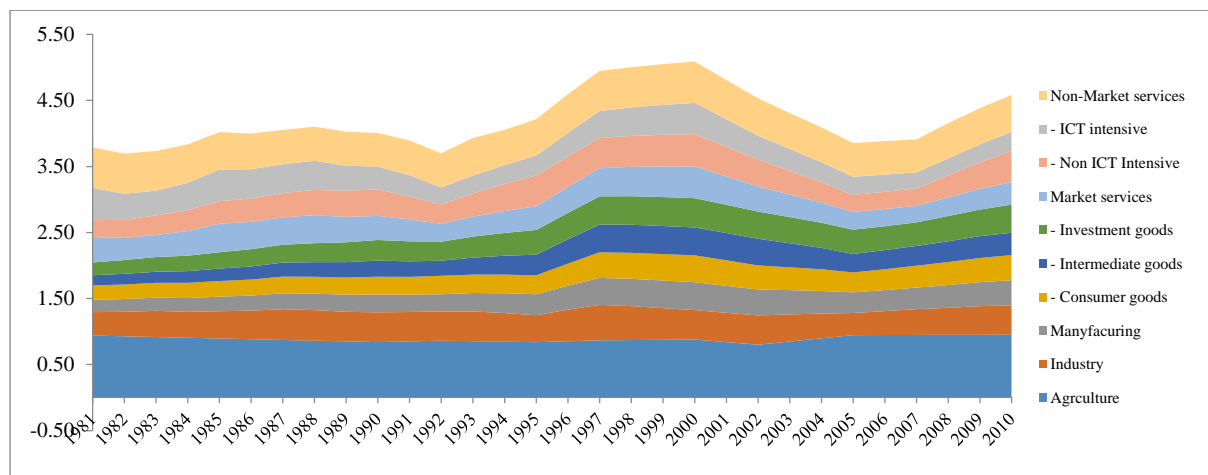
	LI			WI			LPI			Capital income index		
	1995	2005	2015	1995	2005	2015	1995	2005	2015	1995	2005	2015
Agriculture	1.19	1.26	1.00	1.2	1.5	2.7	1.2	1.5	2.6	1.4	1.9	2.5
Industry	2.21	3.72	8.64	0.8	1.1	0.8	1.0	1.1	0.8	2.7	4.8	7.9
Manufacturing	1.30	1.70	1.86	1.6	1.8	4.1	1.9	2.5	4.9	2.6	4.9	9.9
- Consumer goods	1.26	1.63	1.57	1.3	1.5	3.5	1.4	1.8	3.8	1.8	3.1	6.0
- Intermediate goods	1.42	1.85	2.25	1.6	1.8	4.0	2.1	2.8	5.0	3.2	5.8	11.8
- Investment goods	1.57	2.09	4.58	1.7	2.0	2.9	1.9	2.9	3.1	3.2	6.8	14.6
Market services	1.79	2.67	3.16	1.3	1.8	3.9	1.5	2.2	4.7	2.8	7.0	17.6
- Non ICT												
Intensive	1.74	2.78	3.59	1.3	1.5	2.7	1.4	1.9	2.9	2.7	6.8	11.9
- ICT intensive	1.81	2.62	2.97	1.3	1.9	4.7	1.5	2.4	5.8	2.9	7.1	19.9
Non-Market	1.53	2.08	2.83	1.7	2.1	3.5	1.6	2.2	3.5	2.3	5.2	10.9

Source: India KLEMS Version 2019

Within the market services, both ICT-intensive and non-ICT-intensive experienced a significant decline in the labour share. Though there is growth in employment there is a marginal lag between the growth of wage rate and labour productivity in the non-ICT-intensive services. With the huge growth of capital income in this industry leads to the declining labour share. Similarly, the growth of real wage rate is lagged behind the labour productivity growth in the ICT-intensive industry, and substantial growths of capital income are the reasons for the decline of labour share in this industry.

The labour share in the agriculture sector in the PRC has declined from 1981 to 1990 due to the major reforms taken in 1978 (see, figure 5b). However, this has reverted since 1990 and increased until 2010. The employment had reduced in this sector due to the structural change, which resulted in rising labour productivity. In turn, it has driven the wage rate as we can see there is no gap between the growth rate of wage rate and labour productivity growth. There is also a substantial increase in capital income. Initially, the rising capital income and declining employment are the reasons for the decreasing labour share. In the latter years, the substantial rise in wage growth driven by the high labour productivity growth resulted in the reversion of labour share.

Fig.5.b Labour income share by industries (The PRC)



Source: China Industrial Productivity (CIP)

This is to note that there has been a rising trend in labour share in the rest of the industries. The substantial rise in the real wage rate which driven by high labour productivity growth is the basis for the rising trend of labour share in this industry. Contradict to the labour share of the manufacturing sector in India, the PRC experiences positive trends in all

the three sub-industries (see, Table 1b). The employment has been shifting from the consumer goods industry to the other sector since the beginning of 1980, whereas the employment has shifted from the investment goods industry in the latter years. The substantial higher growth in the real wage rate than the labour productivity growth is the main reason for the rise in labour share in the three sub-industries of the manufacturing sector during this period in the PRC.

Table 1.b. Indices of labour, real wage rate and labour productivity (the PRC)

	LI			WI			LPI			Capital income index		
	1995	2005	2010	1995	2005	2010	1995	2005	2010	1995	2005	2010
Agriculture	1.12	1.02	0.86	5.1	13.9	26.5	5.7	13.8	26.2	16.9	12.5	17.9
Industry	2.15	2.24	0.84	5.7	17.1	127.6	5.0	18.1	101.6	9.9	41.1	72.4
Manufacturing	1.16	1.18	0.82	17.4	54.8	209.6	10.2	32.7	103.0	9.8	32.5	63.8
- Consumer goods	0.97	0.98	0.47	15.2	46.2	235.5	11.6	33.5	134.9	10.1	29.2	50.7
- Intermediate goods	1.47	1.29	1.50	15.9	49.8	110.0	7.8	27.3	50.0	9.2	30.0	58.5
- Investment goods	1.31	1.67	0.87	19.8	60.3	328.2	10.3	31.9	149.6	10.4	41.9	93.1
Market services	1.94	3.14	1.05	8.8	14.8	125.3	9.4	21.2	140.9	18.9	78.7	156.9
- Non ICT Intensive	1.68	2.42	1.26	15.8	22.8	145.8	8.7	22.6	79.5	10.4	54.5	71.5
- ICT intensive	2.15	3.70	0.88	6.1	11.6	125.5	9.9	20.6	212.3	29.2	107.8	259.4
Non-Market services	2.41	3.79	3.55	4.8	14.8	39.2	5.4	17.7	42.7	15.5	84.7	169.6

Source: China Industrial Productivity (CIP)

Within the market services in the PRC there is a heterogeneous trend of labour share in the non-ICT-intensive and ICT-intensive services. There has been a positive trend of labour share in the non-ICT-intensive services in the PRC. The positive growth of employment and substantial higher growth of the real wage rate than the labour productivity growth contributed to such a positive trend of labour share in this industry. In contrast, there is a consistent declining trend of labour share in the ICT-intensive services. Initially, there was a higher growth of employment, which turned into negative due to the structural change in the latter years. But the growth of the real wage rate is significantly lagged behind the labour productivity growth during this period, which is the main reason for the decreasing trend of labour share. This is to observe that there is significant growth of employment in the non-market services. However, the lag between the growth of the real wage rate and labour productivity, and also a higher growth of the capital income resulted in the declining labour share in this industry in the PRC.

4. Theoretical Prospective

We have seen in the previous section there are various scenarios in which labour income share may be changed. The labour share changes due to the differences in growth of employment, growth of wage rate and capital income. The share capital (SK) curve of

Bentolia and Paul (2003) shows functional relation between labour share and capital output ratio as below.

$$LIS = g(k) = kh(k)f(h'(k)) \quad (1)$$

The degree of impact of the capital-output ratio is determined by the elasticity of substitution of the production function between capital and labour (Dao et al., 2017).³ When the elasticity of substitution of capital for labour is larger than 1 (highly substitutable of labour), a decline in the relative cost of capital encourages firms to substitute capital for labour to such an extent so that it declines labor income share despite the lower cost of capital (Arrow et al., 1961).

The theoretical perspectives of the impact of international trade, globalisation or global integration have been well debated Guerriero and Kunal Sen (2012). There is a larger role in the labour income share through trade, offshoring and participation in global value chains (GVCs) (Elsby et al. 2013; Harrison 2002; Rodrigues and Jayadev 2010; WEO, 2007). The other drivers of labour income share are institutions, policies, and labor and product markets regulations, and technological advancement (Dao et al., 2017).⁴

The technological progress led by the innovations in information and communication technologies and automations, thereby it reduces the prices of capital goods and hence it substitutes capital for labours disproportionately to affect the labour share negatively (Karabarbounis and Neiman, 2014; Acemoglu and Restrepo, 2018). In addition rising capital intensity due to rising industry concentration and the emergence of large scale firms have a role in changing labour share (Autor et al., 2017; Kehrig and Vincent, 2017). The globalisation is also responsible for such declines as the various country adopts different measures of fiscal reform (like capital cess, tax concessions, etc.) to attract capital for the industrial development in a globalized world (Rodrik, 1998). The global value chains participation and offshoring can affect the labour share negatively (Feenstra and Hanson, 1997). In this paper, we focus on the role of **global economic integration** on the labour income share in India and the PRC.

Global Economic Integration: This is a very broad concept, which is measured mainly through international trade, foreign direct investment, financial integration and offshoring

³ The elasticity of substitution between capital and labour represents how they substitute each other with a response to change in their relative cost. Its role in the income distribution has strong conceptual and empirical bases mainly originated from Arrow et al., (1961).

⁴ The measurement issue is a crucial factor mainly in developing countries. For instance the measurement of labour income of the self-employed which affect the labour income share.

(Mallick, 2017). The globalization may affect the labour income share through the two channels i.e., the traditional trade theory and the bargaining power framework (Doan and Wan, 2017). The neo-classical's Heckscher-Ohlin model and Stolper-Samuelson model predict that the advanced economies gain from trade by specialising the production of capital-intensive goods as they are capital-abundant. This results in the reallocation of resources which lowers the labor income share in these countries. The opposite is predicted in the emerging market and developing countries, which are labor-abundant. This theory fails to predict in countries like India and China because of the consideration of several unrealistic assumptions.⁵ These models do not capture the effect of the mobility of capital and labour across the countries, and the heterogeneity of labour in terms of their skills. The globalisation may favour skilled labour in developing and emerging countries (Stockhammer 2009).

The second channel is the bargaining power framework (Rodrik 1997; Slaughter 1999). Under imperfect competition, the objective of entrepreneurs and workers is to maximise their factor price in production. The maximising factor price depends on their bargaining power, which in turn determined by the fixed costs of relocating to the foreign country, and importantly the differences of return to factor between the home country and the foreign country (Harrison 2005). Hence, the promotion of globalisation through a reduction of the barriers of trade and FDI lead to the reduction of fixed costs of reduction and increase the rate of return in abroad or in the developing countries. The more mobile factors i.e., capital take advantage of globalisation (Rodrik, 1997). This leads to an increase in capital income share in the developing and emerging countries. Rodrik, (1997) and Elsbj et al. (2013) put forth the argument is that trade integration reduces the unionization rates and bargaining power of labour which causes a decline in labor share, though the empirical evidence have shown a mixed experience (Slaughter 2001; Brock and Dobbelaerre 2006; Arbache 2004; Dumont et al. 2006).

Offshore: This variable is our disaggregated industry level analysis. On theoretical grounds, a combination of reduction of barriers to international trade and capital flows with technological progress provides the incentive to the firms to produce in foreign locations to reduce the cost of production. Through offshoring tasks, the firms gain profits by lowering costs. In this process, mainly in emerging countries if capital equipment and foreign workers substitute the domestic workers, there will be a decline in labour income share. Doa et al.,

⁵ In H-O model it is assumed that (1) there is free flow of labor and capital flow between sectors within the country only, (2) there are differences in the amount of labor and capital in two countries differ, (3) the two countries have the same level of technology and (4) The trading countries have same tastes.

(2017) pointed out that due to offshore there the labour share is likely to be affected adversely in both the emerging and developed countries. The offshoring tasks affect the labour income share through factor composition in the production process. In the developed economies, the offshored tasks are mainly labor intensive in nature, by which the production composition of other activities may become more capital intensive. Consequently, the labour income share in the recipient country will decline.

Doa et al., (2017) argues that there are two mechanisms through which advanced offshoring affect labour share in the emerging countries. First, due to the low cost of capital in the advanced countries, they automate primary activities which are done by the workers; this will affect the labor share in the advanced countries itself. Further, they will offshore to emerging countries those tasks which can not replace labour.⁶ Which also adversely affect the labour share in the advanced countries. Second, the offshore of the emerging countries attract the entrepreneurs from the advanced countries due to the relatively higher cost of capital. Due to low substitution of capital for labour in the emerging countries, it may not replace labour however, it changes production composition, which increases the capital income share and adversely affects the labour income share in the emerging countries.

5. Empirical methodology and Data

The study focuses on the impact of economic integration on labour share at the aggregated level and sectoral level in India. For the aggregated level analysis from the year 1980 to 2015, we have used time series methods, particularly the Auto-regressive Distributed Lag (ARDL) method. The detailed methodology is discussed in Pesaran et al. (2001), Narayan (2005) and Nkoro and Kelvin (2016). ARDL cointegration technique is robust when there is a long run relationship between the variables under consideration in a small sample size. The cointegration of the variables is identified through the F-statistic/Wald test. The disadvantage of this approach is that it does not work in the presence of variable(s) with integrated of order 2 or I(2).

The second part of the empirical analysis includes 27 KLEMS-sector over the period from 1995–1996 to 2015–2016. Due to several advantages of panel data methods (Baltagi 2001),⁷ The paper uses panel structure for the analysis. A general panel data equation is:

⁶ That is the tasks with low elasticity of substitution between capital and labor.

⁷ Panel data controls the individual heterogeneity across the sectors and has a higher degree of freedom and hence the increases efficiency

$$Y_{it} = \alpha + \beta GT_{it} + \gamma C_{it} + \mu_i + \varepsilon_{it} \quad (2)$$

where $i = 1, 2, \dots, n$ ($n = 27$) and $t = 1995\text{--}1996, 1996\text{--}1997, \dots, 2015\text{--}2016$. Y_{it} is the LIS and GT_{it} is the variables related to economic integration i.e., trade and financial integration, and C_{it} is the vector of control variables. The composite residual error consisting of μ_i and ε_{it} , where μ_i is the time-invariant sector-specific component, which captures the unobservable characteristics that specific to the sectors, which have a significant impact on the LIS, and ε_{it} , is the disturbance term that satisfies the assumptions of the classical linear regression model.

The above classical panel methods allow only the intercepts to differ across the cross section, where slope remains homogenous. The assumption of the homogeneous slope coefficient is often inappropriate, which has been highlighted in Pesaran and Smith (1995); Pesaran et al., (1997, 1999); Im, Pesaran, and Shin (2003); and Phillips and Moon (2000).⁸ Pesaran et al., (1997, 1999) brought out two new approaches to estimate nonstationary dynamic panels which parameters are heterogeneous across groups. They are the mean-group (MG) and pooled mean-group (PMG) estimators. The MG estimator relies on estimating N time-series regressions and averaging the coefficients (see Pesaran and Smith 1995). The PMG estimator relies on a combination of pooling and averaging of coefficients (see Pesaran et al., 1997, 1999). The Hausman test determines the appropriate technique based on the empirical specifications.

Data

Our data set on total economy comprises annual data during the period from 1980-81 to 2015-16 from Pen World Table (PWT) and KOF database on the measurement of global integrations (Gygli, 2019). The detailed measurement of variables and databases are presented in Table 2a. The labour income share is the share of income accrued to labour in the total income of an economy. Economic integration consists of trade openness and financial integration. Trade openness is represented by four alternative variables. They are trade index of KOF (KOFT), the ratio of trade to GDP (Trade), export ratio to GDP (EXP), the ratio of import to GDP (IMP) and the govt. consumption expenditure to GDP (GCES). The other explanatory variables are total factor productivity (TFP), capital intensity (KIN) and human capital. The economic structure is represented by two variables. They are the contribution of structural change (SC) to labour productivity growth, which is calculated through the shift-share method (Mallick, 2017). The other one is the share of the manufacturing sector in GDP

⁸ For more a detailed discussion of this issue, see chapter 12 in Baltagi (2001).

and industry as whole in GDP (INDS). The impact of economic reform is taken into account by introducing a dummy variable which takes value 0 before 1991 and otherwise 1 for the remaining years. The descriptive statistics of the included variable are provided in Table A1 in appendices.

Table 2 a. Variables and data for the total economy analysis

Variables	Measurement	Data
Labour income share (LIS)	Ratio of total compensation to labour to total income	Penn World Table (version 9.1)
Capital intensity (KIN)	Ratio of capital stock to labour	“do”
Productivity	Total factor productivity index	“do”
International Trade	Export share and import share in GDP	“do”
Human capital	This index captures years of schooling with the returns to education.	“do”
Welfare expenditure	Govt. consumption expenditure share in GDP	“do”
Structural change	Shift share analysis is used by decomposing LPG into within effect and between (or structural change) effect	Asia KLMES
MANUFAC	Manufacturing sector share in GDP in the total economy. Also manufacturing and rest of industries share in GDP	“do”
Globalisation	Overall globalisation index, which includes economic integration, social globalisation and political globalisation	KOF
Economic globalisation	Both the trade and financial integrations are included	“do”
Trade globalisation	This includes trade in goods and services, and trade diversity	“do”
Financial integration	Foreign direct investment, Portfolio investment, International debt, International reserves and International income payments	“do”

Table 2.b Variables and data at the sectoral level

Variables	Measurement	Data	Remarks
Labour income share (LIS)	Ratio of total compensation to labour to total income	IKLEMS	
Capital intensity (KIN)	Ratio of capital stock to labour	IKLEMS	
Productivity	Total factor productivity index	IKLEMS	Total factor productivity growth is exponentially indexed with reference year 1994=1.
International Trade	Three measures are used. They are the ratio of export and import of final goods to GDP	TiVa of OECD versions 2016 and 2018	Export and import at current year prices in USD is converted to constant prices in national prices by using the aggregated export and import deflator from Asia Productivity Organisation (APO) data.
Offshore	Ratio of imported intermediate goods to the total intermediate goods	Imported intermediate goods taken from TiVa and total	Imported intermediate goods are also converted to constant prices at 2011.

		intermediate goods from IKLEMS	
Value added share	Spectral share in GDP in the total economy	IKLEMS	

The disaggregated analysis consists of 27 KLEMS sector during the period from 1995-96 to 2015-16. The data are taken from IKLEMS of RBI and Trade-in Value added (TiVa) of Organisation of Economic Cooperation and Development (OECD). The construction of variables and data are described in Table 2b. In this analysis, there is no data on financial integration for the KLEMS industries. We have included only the variable related trade, which are trade openness, ration of export to GDP, the ratio of import to GDP, the ratio of import to total trade and offshore. The other explanatory factors are capital intensity, TFP and sectoral value added share.

6. Empirical Results

6.1. The Aggregated Economy

The aggregated level analysis uses the ARDL cointegration approach, which has precondition that none of the included variable is of the integrated of order 2, i.e., $I(2)$, because the computed F-statistics of Pesaran et al. (2001), which determines the presence or absence of the long-run equilibrium does not work. Hence, all the variables included in the aggregated analysis are verified their integrating order through the tests of Augmented Dicky-Fuller (ADF) and Phillips-Perron (PP) and the most powerful unit root test, the Kwiatkowski–Phillips–Schmidt–Shin (KPSS) test. These tests confirm that all the variables are either $I(0)$ or $I(1)$.⁹

First, the models are specified or the lag orders of the variables are determined based on the AIC criteria. Because, the lag structure should be optimum which is large enough to mitigate the residual serial correlation and, also it is small enough so that conditional error correction model is not unduly over-parameterized (Pesaran et al., 2001). Once the model is specified the next task is to test whether there is cointegration or the long-run equilibrium relation between the variables in the chosen model. This is done through the ARDL bound testing procedure. If the computed F-statistics is larger than the upper bound of the critical value then we can say that there is the presence of cointegrating relations in the model. This has led to the estimation of error correction model. It gives results on the significance of the error correction term, long-run relations and short-run relations. For the validity of model,

⁹ The results are available if requested.

we used the diagnostic tests of Breush-Godfray serial correlation LM test, Breush-Pagan Godfray test of heteroskedasticity, and cusum and cusum square test for stability. We estimated two sets of the model starting from LIS as a function of KOFT, and TFP, KIN, KOFF, HC. The KOFT is replaced by TRADE in the second model. The long-run results and short-run or ECM representation of the models are provided in Table 3a and Table 3b respectively.¹⁰

Table 3.a. Long-run results

Independent Variables	India (1 0 0 0 0 0 0)	The PRC (1 0 0 0 0 0 0)	Japan (1 1 1 0 0 1 0)
TFP	-0.23 (0.14)**	-0.35 (0.2)*	-0.46 (0.07)***
KIN	0.08 (0.03)**	0.16 (0.10)*	-0.29 (0.14)*
KOFT	-0.08 (0.02)*	-0.33 (0.19)*	-0.22 (0.05)***
KOFF	-0.06 (0.03)*	0.01 (0.04)	0.002 (0.04)
HC	-0.08 (0.20)	-0.08 (0.28)	0.06 (0.46)
GCES	0.08 (0.25)	0.55 (0.47)	0.69 (0.56)
INDS	-0.59 (0.32)*	0.68 (0.63)	0.10 (0.39)
F-stat	5.16***	3.5**	5.9***
k=7	90%	95%	99%
I(0)-lower bound	2.03	2.32	2.96
I(1)-upper bound	3.13	3.5	4.26

Notes: *, ** and *** indicates statistical significance at the 10%, 5% and 1% levels respectively.

To start with the estimation for India, it supports the lag order of (1 0 0 0 0 0 0), which is determined based on AIC. The results show that productivity and both the variables of economic integration affect labour share negatively in the long-run during the period from 1980-81 to 2015-16. The capital intensity positively affects the labour share in this period. Human capital has a neutral effect on the labour share in the long-run. The existence of the long-run causality is established from the F-stat, which is 5.16 for the seven variables regressors.¹¹ The computed value is higher than the critical values at both the lower band and upper band. The impact of INDS is negative and statistically significant indicates that the economic structure is pooling down labour share in India.

Table 3.b. Short-run results

¹⁰ We present the results based on the KOFT measurement of openness for all the three countries.

¹¹ Narayan (2005) argues that the critical values of F-stat depend on the sample sizes. As critical values of Pesaran et al (2001) are for larger sample size, we also compare the values with 34 number of observations from Narayan (2005).

Independent Variables	India	The PRC	Japan
D(TFP)	-0.21 (0.09)**	-0.11 (0.05)**	-0.46 (0.07)***
D(KIN)	0.05 (0.02)**	0.05 (0.02)**	-0.45 (0.15)**
D(KOFT)	-0.04 (0.02)**	-0.10 (0.03)***	-0.02 (0.03)
D(KOFF)	-0.05 (0.02)**	0.004 (0.01)	0.001 (0.02)
D(HC)	-0.05 (0.13)	-0.03 (0.09)	-0.03 (0.25)
D(GCES)	0.05 (0.16)	0.18 (0.14)	0.38 (0.26)
D(INDS)	-0.37 (0.23)*	0.22 (0.12)*	0.05 (0.21)
ECM(-1)	-0.63 (0.13)***	-0.33 (0.19)**	-0.54 (0.13)***
C	0.23 (0.21)	-0.15 (0.18)	0.40 (0.43)
R-sq	0.61	0.50	0.84

Notes: *, ** and *** indicates statistical significance at the 10%, 5% and 1% levels respectively.

The error correction representations of the estimated ARDL models for India, PRC and Japan are provided in Table 3b. In India, the existence of long-run causality from the independent variables to LIS is reconfirmed from the negative sign and statistical significance of the error correction term, ECM(-1). In the short-run the KOFT, KOFF, TFP and industrial sector income share has negative effects as well. The capital intensity affects the labour share positively. However, the human capital and welfare expenditure do not exert any influence on the labour share in the short-run too.

The empirical results of the PRC show some similarity with the experiences of India. In the long-run, the TFP and KOFT pulling down the labour share in the economy as a whole. In contrast to India, capital accumulation has affected the labour share positively. The financial integration and industrial share have not affected the labour share in the PRC in the long-run, unlike India. The short-run effect of openness, capital intensity and productivity are consistent with their long-run impact in the PRC.

As regards Japan, productivity and openness do affect the labour share adversely. The capital intensity is also affecting the labour share adversely in Japan unlike in the case of India and PRC. The short-run effect of trade and openness are consistent with their long-run impacts. While the factors are not affecting the labour share in Japan in the short-run.

6.2. The dis-aggregated industry

The impact of economic integration through the factors related to trade on the labour share across 27 KLEMS industries during the period from 1995-96 to 2015-16 has been examined

by using the panel ARDL method. The functional specification of the empirical analysis is: LIS is a function of TRADE, KIN, TFP, offshore and economic structure.

The mean group estimator and the pooled mean group estimator of panel ARDL are estimated. Based on the Hausman test, the PMG estimation is selected. The long-run results for India and its comparison with the PRC and Japan are provided in table 4.¹² Firstly, the model or the lag patterns of the variable are chosen by the most common lags across the cross-sections through AIC criteria. In case of India, the model is determined as [2 1 1 1 2 1]. The testing of long-run equilibrium relations is redundant as it is also confirmed from the ECM presentation, which is provided in table A2 in appendices.

In case of India, during the period from 1995-2015, the trade, offshore, productivity and economic structure are found to affect the labour share from the analysis using the disaggregated industry level data. The capital intensity is also affecting positively to the labour share. Hence, the disaggregated industry level analysis confirms to the findings, which are obtained from our aggregated economy analysis.

Table 4: Long-run results of panel ARDL Pooled Mean Group (PMG)

	India [2 1 1 1 2 1]	The PRC [2 1 1 1 1 1]	Japan [2 1 1 1 2 1]
Global Economic Integration			
TRADE	-0.32 (0.04)***	-0.97 (0.2)**	-0.57 (0.8)**
Offshore	-0.06 (0.03)**	0.03 (0.10)	-0.47 (0.42)
Other Factors			
TFP	-0.08 (0.03)**	-0.05 (0.006)***	-0.06 (0.04)***
KIN	0.10 (0.06)*	0.04 (0.005)***	0.32 (0.05)***
Economic Structure	-2.22 (0.9)**	-1.39 (0.24)***	0.90 (2.02)
Observations	513	378	432
Groups	27	27	27
Log Likelihood	1337	1117	1306

Notes: *, ** and *** indicates statistical significance at the 10%, 5% and 1% levels respectively.

The findings on trade are consistent with some of the studies including Maiti (2018). Maiti argues that trade openness weakens the bargaining power of workers and thereby it reduces labour share. In the context of India, the other studies give mixed results on the impact of trade. For instance, Ahsan and Mitra (2014) finds that trade liberalization positively affects the wage share in total revenue for small, average labor-intensive firms, but negatively

¹² As we are focusing on the long-run effects, the short-run results are provided in table A2 in appendices.

affect this share in the larger, less labor-intensive firms by using the three-digit level industry data. The tariff rate is more often used as an instrument for the degree of trade openness. Dutta (2007) find the unfavourable effect of trade liberalisation on wage. Dutta showed that there is a direct relation between tariffs imposed on industries and wage rate of their employee during 1983-2000.

Similarly, there are also mixed views on the effect of capital intensity on the labour share in India. Abraham and Sasikumar (2007) finds a negative effect of capital intensity on the labour share in the organised manufacturing in 1980-2012. Jayadev and Narayan (2018) finds the negative effect of capital intensity, economic structure (or the firm size) and human capital on the labour share in India's formal industrial sector in 1983-2014. However, Maiti (2018) finds a positive effect capital on the labour share. To conclude, the declining labour share is due to technological progress and economic integration. Further, the positive effect of capital intensity is supported by the argument that in case of India the elasticity of substitution between capital and labour is less than unity (Goldar, 2013). This suggests that the possibility of substitution between capital of labour is very low. Hence, the rising capital intensity might be affecting the overall wage rate, which results leads to affect the labour share positively.

This empirical analysis brings out the important finding that there are similar effects of the independent variables on the labour share in the PRC except offshore as we have seen in India. This is also important to find that offshore is not affecting the labour share in Japan in contrast to India and economic structure has not affected in contrast to both India and PRC. Theoretically the advanced countries offshore labour intensives related task from the developing and emerging countries, which makes the production composition more capital intensive. Consequently, it affects the labour share adversely (Dao et al., 2017). These findings needs further research to explore the mechanics behind such contradiction and similarities. On the relationship of trade openness the results are consistent with several studies such as Suzuki et al., (2018), Dao et al., (2017), etc. Dao et al find that the global economic integration and GVCs are the crucial factor of decline in labour share in the emerging countries, while technological progress is the main factor for the advanced countries. As regards capital consistency we find that it is complementary to labour in both the merging and advanced countries. Berger and Wolf (2018) establish these results in the case of France, Italy, and Germany, while Fukao and Perugini (2018) findings are different. This could be due to the consideration of non-primary market economy (excludes primary sector and mining) and excludes non-market services and other sectors which have more than 100 per cent labour share.

7. Conclusions and Policy Implication

The preliminary analysis in this paper has highlighted the declining trend of labour share, which has started in the middle of 1980s in the Indian economy. The broad reason is that the wage rate has not been able to grow with labour productivity growth in contrast to the high growth of capital income during the period from 1980-81 to 2015-16. The empirical analysis both at the total economy level and disaggregated industry level point to a dominant role of TFP or technology change and global economic integration in this declining trend of labour share. The important finding emerged from the disaggregated industry-level analysis is that TFP, openness and offshore affect the labour share negatively. Because technological progress and GVCs participation affect labor share not only the low-skilled labour but also the middle-skilled labor. Dao et al. (2017) argues that they lead to long-term losses to the middle-skill occupations by displacing them to low-wage occupations. The broad conclusion in case of the PRC also remains same.

The paper has crucial policy implications to improve labour share and thereby, the income inequalities. Based on the above findings we recommend that the policies should be devised to support workers better deal with disruptions due to technological advancement and global economic integration, mainly improving human capital, promoting skills and skill up-gradation. In this aspect, the attention should be given to the long-term investment in education which will improve human capital and also provide various opportunities for learning and up-gradation of skills throughout the careers of workers that could help them to deal with the disruptions caused by technological progress and economic integration. Further, the bargaining power of workers plays an important role in determining their wage. The appropriate policies may offset the negative effects of economic integration and technological progress:

Appendices

Table A1: Concordance

SL No	Industry code	KLEMS Industry	OECD TiVa 2016	OECD TiVa 2018
1	AtB	Agriculture, Hunting, Forestry and Fishing	C01T05: Agriculture, hunting, forestry and fishing	D01T03: Agriculture, forestry and fishing
2	C	Mining and Quarrying	C10T14: Mining and quarrying	D05T09: Mining and quarrying
3	15t16	Food Products, Beverages and Tobacco	C15T16: Food products, beverages and tobacco	D10T12: Food products, beverages and tobacco
4	17t19	Textiles, Textile Products, Leather and Footwear	C17T19: Textiles, textile products, leather and footwear	D13T15: Textiles, wearing apparel, leather and related products
5	20	Wood and Products of wood	C20: Wood and products of wood and cork	D16: Wood and products of wood and cork
6	21t22	Pulp, Paper, Paper products, Printing and Publishing	C21T22: Pulp, paper, paper products, printing and publishing	D17T18: Paper products and printing
7	23	Coke, Refined Petroleum Products and Nuclear fuel	C23: Coke, refined petroleum products and nuclear fuel	D19: Coke and refined petroleum products
8	24	Chemicals and Chemical Products	C24: Chemicals and chemical products	D20T21: Chemicals and pharmaceutical products
9	25	Rubber and Plastic Products	C25: Rubber and plastics products	D22: Rubber and plastic products
10	26	Other Non-Metallic Mineral Products	C26: Other non-metallic mineral products	D23: Other non-metallic mineral products
11	27t28	Basic Metals and Fabricated Metal Products	C27T28: Basic metals and fabricated metal products	D24T25: Basic metals and fabricated metal products
12	29	Machinery, nec.	C29: Machinery and equipment, nec	D28: Machinery and equipment, nec
13	30t33	Electrical and Optical Equipment	C30T33: Electrical and optical equipment	D26T27: Computers, electronic and electrical equipment
14	34t35	Transport Equipment	C34T35: Transport equipment	D29T30: Transport equipment
15	36t37	Manufacturing, nec; recycling	C36T37: Manufacturing nec; recycling	D31T33: Other manufacturing; repair and installation of machinery and equipment
16	E	Electricity, Gas and Water Supply	C40T41: Electricity, gas and water supply	D35T39: Electricity, gas, water supply, sewerage, waste and remediation services
17	F	Construction	C45: Construction	D41T43: Construction
18	G	Trade	C50T52: Wholesale and retail trade; repairs	D45T47: Wholesale and retail trade; repair of motor vehicles
19	H	Hotels and Restaurants	C55: Hotels and restaurants	D55T56: Accommodation and food services
20	60t63	Transport and Storage	C60T63: Transport and storage	D49T53: Transportation and storage
21	64	Post and Telecommunication	C64: Post and telecommunications	D58T63: Information and communication
22	J	Financial Services	C65T67: Financial intermediation	D64T66: Financial and insurance activities
23	71t74	Business Service	C71T74: Renting and business activities	D69T82: Other business sector services
24	L	Public Administration and Defense; Compulsory Social Security	C75: Public admin. and defence; compulsory social security	D84: Public admin. and defence; compulsory social security
25	M	Education	C80: Education	D85: Education
26	N	Health and Social Work	C85: Health and social work	D86T88: Human health and social work
27	70+O+P	Other services	C70: Real estate activities+ C90T93: Other community, social and personal services+ C95: Private households with employed persons	D68: Real estate activities+ D84T88: Public admin, defence; education and health

Table A.2. Industrial share in export of final goods

			India			China		
			1995	2005	2015	1995	2005	2015
Agriculture	1	Agriculture, Hunting, Forestry and Fishing	0.03	0.01	0.01	0.02	0.01	0.01
Industry	2	Mining and Quarrying	0.00	0.00	0.00	0.00	0.00	0.00
Consumer goods	3	Food Products, Beverages and Tobacco	0.13	0.05	0.06	0.06	0.03	0.03
	4	Textiles, Textile Products, Leather and Footwear	0.22	0.15	0.10	0.25	0.21	0.18
	5	Wood and Products of wood	0.00	0.01	0.00	0.00	0.00	0.00
	6	Pulp, Paper, Paper products, Printing and Publishing	0.00	0.00	0.00	0.00	0.00	0.00
Intermediate goods	7	Coke, Refined Petroleum Products and Nuclear fuel	0.01	0.04	0.04	0.01	0.00	0.00
	8	Chemicals and Chemical Products	0.03	0.04	0.06	0.02	0.02	0.03
	9	Rubber and Plastic Products	0.01	0.01	0.01	0.01	0.01	0.01
	10	Other Non-Metallic Mineral Products	0.00	0.01	0.00	0.00	0.01	0.01
	11	Basic Metals and Fabricated Metal Products	0.01	0.04	0.03	0.01	0.02	0.02
Investment goods	12	Machinery, nec.	0.01	0.04	0.04	0.03	0.07	0.10
	13	Electrical and Optical Equipment	0.02	0.03	0.03	0.13	0.37	0.32
	14	Transport Equipment	0.03	0.03	0.06	0.02	0.06	0.08
Consumer goods	15	Manufacturing, nec; recycling	0.07	0.11	0.09	0.07	0.09	0.10
Industry	16	Electricity, Gas and Water Supply	0.00	0.00	0.00	0.00	0.00	0.00
	17	Construction	0.00	0.00	0.00	0.01	0.00	0.00
ICT intensive	18	Trade	0.21	0.04	0.04	0.19	0.04	0.05
ICT Non-intensive	19	Hotels and Restaurants	0.04	0.04	0.04	0.04	0.00	0.00
	20	Transport and Storage	0.08	0.07	0.06	0.07	0.05	0.04
ICT intensive	21	Post and Telecommunication	0.01	0.21	0.25	0.00	0.00	0.00
	22	Financial Services	0.00	0.01	0.01	0.00	0.00	0.00
Non-Market services	23	Business Service	0.03	0.03	0.03	0.01	0.00	0.00
	24	Public Administration and Defense; Compulsory Social Security	0.00	0.00	0.00	0.00	0.00	0.00
	25	Education	0.00	0.00	0.00	0.00	0.00	0.00
	26	Health and Social Work	0.00	0.00	0.00	0.00	0.00	0.00
	27	Other services	0.05	0.02	0.02	0.05	0.00	0.00

Sources: OECD TiVa (2016; 2017)

Table A.3. Industrial share in import of final goods

		India			China		
		1995	2005	2015	1995	2005	2015
Agriculture	1	0.04	0.02	0.02	0.05	0.03	0.04
Industry	2	0.00	0.00	0.00	0.00	0.01	0.01
	3	0.05	0.08	0.12	0.07	0.05	0.06
Consumer goods	4	0.02	0.05	0.04	0.06	0.01	0.01
	5	0.00	0.00	0.00	0.00	0.00	0.00
	6	0.02	0.00	0.00	0.01	0.00	0.00
	7	0.06	0.02	0.01	0.00	0.00	0.00
Intermediate goods	8	0.04	0.04	0.04	0.03	0.02	0.03
	9	0.01	0.01	0.01	0.01	0.00	0.00
	10	0.00	0.00	0.00	0.00	0.00	0.00
	11	0.02	0.01	0.01	0.01	0.01	0.01
	12	0.16	0.13	0.11	0.23	0.22	0.12
Investment goods	13	0.12	0.10	0.14	0.16	0.24	0.16
	14	0.05	0.13	0.13	0.06	0.09	0.13
	15	0.06	0.06	0.04	0.01	0.02	0.02
Industry	16	0.00	0.00	0.00	0.00	0.00	0.00
	17	0.01	0.00	0.00	0.02	0.00	0.00
ICT intensive services	18	0.13	0.09	0.08	0.15	0.10	0.09
ICT Non-intensive	19	0.02	0.04	0.02	0.03	0.05	0.11
	20	0.12	0.09	0.05	0.08	0.07	0.06
ICT intensive services	21	0.01	0.03	0.03	0.00	0.02	0.04
	22	0.01	0.03	0.07	0.01	0.01	0.01
Non-Market services	23	0.01	0.05	0.06	0.00	0.02	0.02
	24	0.00	0.00	0.00	0.00	0.00	0.00
	25	0.01	0.01	0.01	0.00	0.01	0.02
	26	0.00	0.00	0.00	0.00	0.00	0.00
	27	0.03	0.02	0.01	0.01	0.02	0.03

Sources: OECD TiVa (2016; 2017)

Table A1: Descriptive Statistics, India

Variable	India				PRC				Japan			
	Mean	Std. Dev.	Min	Max	Mean	Std. Dev.	Min	Max	Mean	Std. Dev.	Min	Max
LIS	0.61	0.09	0.48	0.74	0.58	0.02	0.55	0.61	0.58	0.02	0.55	0.62
LKIN	9.97	0.44	9.40	10.83	9.92	0.85	8.80	11.52	12.48	0.25	11.96	12.73
LTFP	-0.13	0.12	-0.33	0.09	-0.31	0.19	-0.62	0.03	-0.02	0.04	-0.12	0.03
LKOFT	3.30	0.38	2.90	3.89	3.62	0.27	3.27	4.05	3.69	0.21	3.48	4.00
LKOFF	3.08	0.61	2.24	3.81	3.44	0.46	2.19	3.92	4.02	0.14	3.71	4.32
LHC	0.51	0.15	0.25	0.73	0.73	0.12	0.53	0.92	1.19	0.05	1.10	1.27
INDY	0.27	0.01	0.25	0.30	0.49	0.03	0.43	0.54	0.35	0.04	0.28	0.41
GCES	0.15	0.03	0.10	0.21	0.21	0.04	0.13	0.26	0.16	0.02	0.12	0.20

Note: Total number of observation is 36 for all the countries.

Table A2. Short-run results of ARDL PMG estimation

Independent Variables	India	The PRC	Japan
LD.LIS	0.04 (0.06)	0.67 (0.05)***	-0.17 (0.04)***
D(TRADE)	-0.03 (0.07)	0.29 (0.25)	-0.66 (0.23)
D(OFFSHORE)	-0.11 (0.13)	0.81 (1.27)	-0.12 (1.9)
D(TFP)	-0.15 (0.05)***	0.06 (0.03)**	-0.24 (0.07)***
D(KIN)	-0.19 (0.28)	-0.04 (0.02)**	-0.17 (0.04)***
LD(KIN)	0.28 (0.12)**		-0.23 (0.11)**
D(Eco. Structure)	-0.58 (1.18)	-0.72 (1.01)	-0.11 (0.04)**
ECM(-1)	-0.38 (0.07)***	-0.44 (0.07)**	-0.12 (0.06)**
C	0.07 (0.05)	0.06 (0.02)***	-0.37 (0.21)

Notes: *, ** and *** indicates statistical significance at the 10%, 5% and 1% levels respectively.

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