Globalisation and Labor Productivity in OECD Regions

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Abstract: *Globalisation, coupled with advancement in information, communication and technology has increased the demand for quality labour, having knowledge and competing to maximise production. Labour productivity is the important sources income and economic growth. The objective of this paper is to analyse the depth of globalisation impact on labour productivity in the OECD regions. The analysis has used data from the OECD Statistics and World Development Indicators of World Bank, comprising 22 years, from 1990-91 to 2011-12. A multiple regression model using panel data is estimated to analyse the relationship between globalization and labour productivity. Findings of the study show that globalisation indicators like FDI and economic openness have positive and significant impact on labour productivity. Then, a number of possible determinants pertaining to economic factors and labour factors have been explored as well*

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I.   Introduction:

The world economy is moving towards global integration. The globalisation issue has already been long debated by researchers. Hoogvelt (19978) characterised globalisation in terms of the world habitation being increasingly dependent in a system. This occurs through trade, ties and co-operation between countries, the existence of international organisations and the global awareness manifested through the exposure of the global community to unify communication through the compression of time and space. From the economic perspective, Thomas and Skidmore (1997) view globalisation as the expansion of companies through national boundaries.

Labour and capital factor play a crucial role in contributing the output growth. Efficiency of labour pushes up the productivity. Successful development not only covers growth of physical labour and capital but also growth of productivity. Understanding the fact that input is limited then emphasis must be shifted to productivity. Porter (1990) stated that the key for income per capita growth is productivity growth. While, the key for economic growth is innovation, the key to innovation is the success of the innovation system developed in a country.

Globalisation can be linked with labour productivity through various ways including trade liberalisation or economic openness, exposure to new technology and FDI. FDI is often related to inflow of new technology to the recipient country. Developed countries usually use the latest production technology compared to the less developed countries. Therefore, spillover effect of technology can occur from the developed countries, the origin of FDI to the FDI recipient developing countries. The spillover effect enhances labour productivity through the acquisition of new technology.

Besides that, globalisation is also often associated with increase in competitiveness, which brings about the concept of global competitiveness; a measurement to investigate the depth a country is able to compete at the global level. According to the Global Competitiveness report (GCR), the gap in the differences in the competitiveness has been declined in the World and OECD countries as well. This indicates are there is the increase in in competition in the countries to provide conducive investment environment climate to foreign investors. In order to raise and maintain the high per capita income, the various countries have emphasised productivity and innovation based growth. Therefore, they are monitoring the country's competitiveness level and taking measures to enhance competitiveness from time to time.

Over the past decades, OECD countries have undergone significant structural changes resulting from their closer integration into a global economy and rapid technological progress. These changes have brought higher rewards for high-skilled workers and thus affected the way earnings from work are distributed. The skills gap in earnings reflects several factors. First, a rapid rise in trade and financial markets integration has generated a relative shift in labour demand in favour of high-skilled workers at the expense of low-skilled labour. Second, technical progress has shifted production technologies in both industries and services in favour of skilled labour. All these structural changes have been well underway since the early 1980s and accelerating since the late 1990s (OECD, 2011). During the globalisation period, OECD regions face the muti-featured behavior of income distribution. In the one hand, there is declining of the cross country differences in income. And, at the other hand, there is increase in the income inequalities in the OECD countries (Gottschalk & Smeeding, 1997). As labour productivity is the important sources of income and growth, this is policy imperative to study the impact of globalisation on labour productivity.

Therefore, the issue is that how far the globalisation indicators, like FDI and economic openness can affect labour productivity. This study is designed to answer this question by dividing the discussion into five sections. The next section discusses literature review, followed by methodology and source of data, results, conclusion and policy implication.

II. Review of Literature:

Increase in labour productivity benefits the employer, worker, consumer and the nation. To enhance global competitiveness, increasing labour productivity is essential. Increasing labour productivity also means increasing wealth shared together by the worker, employer and the nation. According to Leong (2000), there is a need to increase labour productivity by emphasising on quality input and effective process. Leong has also stated that there are five factors which influence the increase in productivity; those are capital, human resource, materials, information and technology. Solow (1957) argues that labour productivity is the most important determinant influencing the nation's level of income. Meanwhile, according to Englander and Gurney (1994), low labour productivity will be a barrier to income increment rate and can also increase the incidence of conflicts in income distribution. Labour productivity has a close relationship with economic growth and is a determinant of economic stability. Therefore, understanding the determinants and sources for increasing labour productivity is important to understand economic growth. Among the factors that increase labour productivity are technology, physical capital and human resources (Rahmah Ismail,

2009). However, the study on the effects of globalisation on labour productivity that analyses all the globalisation indicators as in this research is not common. Most of the studies focus on a particular globalisation indicator, for example, trade (export and import), and technology or FDI in detail. The empirical findings on the relationship of productivity with the globalisation indicators, and economic and labour factors are discussed as bellow.

FDI

The impact of FDI on productivity is known as the capital deepening which implies the transfer of knowledge and technology together with FDI into a host economy. It is supposed that TNE (transnational enterprises) do not only bring physical capital into a host economy, but also they transfer the technology and managerial skills since they want to maximize their profits. Further, the neoclassical growth model of Solow (1956) assumes that capital falls into diminishing returns thereby the long-run growth rate equals to the growth rate of technology. The AK growth model of Frankel (1962) and Romer (1986) is known as the first wave of endogenous growth models. The proponents of the AK growth model assume that during the capital accumulation, externalities may help capital from falling into diminishing returns. In here, externalities are created by the learning-by-doing argument of Arrow (1962) and the knowledge spillovers effect. According to the AK model, as a country continues to attract FDI not only its capital stock enlarges (capital widening) but also productivity increases.

The product variety model of Romer (1990) argues that productivity growth comes from an expanding variety of specialized intermediate products (Aghion & Howitt, 2009. Thus, it is expected that FDI induces economy-wide productivity and economic growth by expanding the variety of intermediate products. However, the Schumpeterian model of Aghion and Howitt (1992) constitutes the second wave of endogenous growth models together with the product variety model of Romer (1990). A country would transfer the innovative technology with FDI inflows and the new quality improving mechanisms that would give rise to productivity and economic growth.

The impact of FDI on productivity has been empirically examines in Chin-Chen and Yir-Hueih (2000), Liu et al. (2001), Vather (2004), Koirala and Koshal (1999), Thoburn (2004), Rasiah and Gachino (2005) and Ramstetter (2004). Chin Chen and Yir-Hueih (2000) studied the efficiency and growth of productivity in 10 Asian countries and found that FDI inflow contributes to increase in labour productivity through technological innovation. Liu et al. (2001) study the impact of FDI on labour productivity in the Chinese electronics industry and found high positive impact. Vather (2004) argues that the impacts of FDI on labour productivity is based on the level of economic progress of the recipient country. Vather

studied at the firm level in the manufacturing industry for two transition countries namely, Estonia and Slovenia. The results show that in Estonia, foreign firms that are export oriented have lower labour productivity compared to local firms with foreign investment and domestic market oriented. On the other hand, in Slovenia, firms with foreign investment are not significantly correlated to labour productivity. Furthermore, there is positive FDI spill over to local firms in Estonia, whereas, in Slovenia there is positive FDI impact but no FDI spill over in firms with foreign investment.

Koirala and Koshal (1999) investigated the effects of entry of foreign firms in Nepal as an indicator of globalisation clearly prove that labour productivity in foreign firms is relatively higher than that in the domestic firms. The main factor for this higher performance is because foreign firms are utilising capital-intensive technology. Similar study by Robert and Thoburn (2004) analyses the effects on the entry of foreign firms and workers for the textile industry in Africa. The effects of investment of foreign firms in Africa had changed the textile industry work force due to restructuring of firm operations utilising capital-intensive technology, rationalising production and focusing on various outputs. Results show that labour productivity has increased due to production operations utilising capital-intensive technology, which reduced total work force in the industry. The study is supported by Rasiah and Gachino (2005) who found that labour productivity is higher in foreign firms compared to domestic firms in the textile industry and garment production in Kenya. Labour productivity achievement is motivated by higher technology intensity for the foreign firms. Nevertheless, Ramstetter (2004) argues differently from other studies, showing that globalisation impact, namely, foreign ownership has a weak relationship with labour productivity and wages in the services sector in Thailand. However, Xiaming *et al.* (2001) found positive impact of FDI in the electric industry of China, which is through the direct utilisation of capital input, technology, management skills and indirect spillover effects towards the domestic firms. Also argues that, labour productivity depends on the degree of foreign presence in the industry and other variables like capital intensity, human capital and firm size.

Economic Openness

Mei Hsu and Been-Lon Chen (2000) studied the factors that influence labour productivity between big and small sized firms in Taiwan's manufacturing sector. The results show that increase in the export sector will increase labour productivity in small sized firms, but decrease labour productivity in larger firms. Foreign direct investment has positive effect on labour productivity for the smaller firms, but negative effect for the larger firms.

Study in Indonesia conducted by Sjoholm (1997) investigates if international trade openness affects labour productivity using services industry data from 1980 to 1991. The

impact of international trade openness is tested using the data on industry's participation in export and import. Results show that the export variable has positive impact on labour productivity. The bigger is the export from total output, the bigger the growth of labour productivity. Import also caused high growth of labour productivity. Sjoholm argued that trade liberalisation causes the transfer of technology and knowledge that eventually increases labour productivity of the industry in a country.

Prasiwi Westining (2008) studied the impact of international trade on labour productivity in the textile industry and textile product with the 5 digit industrial code in Indonesia using panel data from 1991 to 2005. The results of the study show that abolishing import quota gives negative influence on labour productivity; meanwhile, labour productivity is significantly influenced by the export intensity variable with positive effect.

Through the same method and approach, Phan (2004) studied the services industry in Thailand, Kumaran (1999) studied the manufacturing industry in Australia from 1989 to 1997, while Bloch and Mcdonald (2000) studied the manufacturing industry in Australia from 1984 to 1993, and Kwak (1994) probed into the manufacturing sector in Korea. All four studies show that trade liberalisation has positive and significant impact on labour productivity.

Study by Hung *et.al* (2004) also analyses the impact of international trade on labour productivity and total factor productivity (TFP). Their study was more comprehensive, whereby; growth of labour productivity was divided into three, caused by changes in import price, impact of economies of scale towards new market for import and export changes. Change in import prices on labour productivity is positive and significant, whereby; a drop in import prices by one percent will increase growth of labour productivity by 3 percent for both of the models estimated, namely, fixed-effects model and random-effects model. Both models assume that the changes in import price are constant for the whole period. The second variable, new market for import is found to have a positive and significant role on the growth of labour productivity. When both the models assume changes in import prices differ, the new market for import variable also influences labour productivity positively. The third factor increases export positively to influence growth of labour productivity. Paus *et.al* (2003) studied the relationship between trade liberalisation and labour productivity in the manufacturing sector among 27 industries in Latin America. He found that trade liberalisation has positive relationship with all variables under study, namely, export and import, and labour productivity in various aspects.

Differing from the study by Egger and Egger (2006), Tomiura (2007) studied the international outsourcing on labour productivity. Nevertheless, study by Tomiura (2007) also

analysed other globalisation variables like export and foreign ownership through FDI. Study by Tomiura (2007) found that foreign firms have higher labour productivity compared to domestic firms that do international outsourcing. Egger and Egger (2006) focus on low skilled labour productivity in the manufacturing sector for Europe. The results show that in the short-run, international outsourcing has negative impact on labour productivity; meanwhile, in the long- run the impact is positive.

Economic and Labour Factors

In addition to globalization including FDI and openness, the other factors pertaining to economic factors and labour factors influence the productivity in the OECD regions. The economic factors such as fixed investment, education expenditure and the structure of economy determine the productivity of labour. Oulton (1990) studied labour productivity in the industrial sector in England during the 1970s and 1980s using the panel data. The results show that investment in new technology gives significant contribution to growth of labour productivity in the industrial sector, whereas, increase in price of intermediate goods makes labour productivity to decrease. Apergis et. al. (2008) studied the relationship between labour productivity, innovation and technology transfer in the services industry in six selected countries in Europe. They found that research and development (R&D), human capital and international trade could accelerate innovation process and facilitate transfer of technology. The results show that there is a balanced relationship between labour productivity, innovation and technology transfer in the long run. Furthermore, R&D, trade and human capital have statistically and significantly affected labour productivity through innovation and spread-out of technology. Moreover, a handful of studies were focused on several particular factors which have significant influences on labor productivity or productivity. Below, we describe some of the important determinant factors of labour productivity in a detailed manner.

Fixed investment is a key factor for the production and regional development under both capitalist and socialist systems. The increase in the labor productivity is mainly a result of investment in the fixed capital and capital stock formation. Machinery, assembly lines, factories, infrastructure and technological innovation, with the latter are usually embodied in the new fixed assets. It is noteworthy that the fixed investment in OECD regions has uneven distributions. More developed countries US, UK, Luxumebourg have recorded more rapid growth in fixed investment. As an evidence of capital investment impact on growth, Wei (2000) found out positive relationship between fixed investment and real GDP per capital in China. Demurger (2001) also showed the empirical evidence on the links between the infrastructure investment and the real GDP per capita.

The share of service sector in the economy is an important factor for its competitiveness, openness, productivity and overall capability of nations. Kuznets (1979) stated that "it is impossible to attain high rates of growth of per capita or per worker product without commensurate substantial shift in the shares of various sectors". The hypothesis that structure change is an important source of growth and productivity improvement is a central tenet of the growth accounting literature (Maddison, 1987). The recent driver of economic growth is the service sector particularly in OECD regions, where service sector is dominating over the other sectors.

The education levels are linked to productivity growth, as argued in Schultz (1975), Welch (1975), Benhabib and Spiegal (1992). In general, an educated, motivated and flexibie labour force will be able to adapt more easily to new processes and new industries, and hence allow productivity to rise more rapidly. In models such as Romer (1990), a set of highly educated individuals constitute the sector of the economy that creates new technology and is closely related to the share of R&D in GDP. The flow of new technology (and productivity growth) will in turn be linked to this share. Further, there also may be positive externalities from human capital. Where the average level of human capital is high, the incidence of learning from others will be higher, and it is likely that there will be greater productivity gains to be derived from exchanging ideas (Lucas, 1988). Human capital often flows to countries that already have large amounts of such capital (the "brain drain"), suggesting that the return to such human capital is negatively related to its scarcity rather than positively as might be predicted from standard analysis. Moreover, Kremer and Thompson (1993) suggests that there may be some intergenerational complementarities in human capital -for example, the productivity of a young doctor may be raised by the presence of more experienced doctors - so that the returns to increasing human capital investment may be relatively high in already well-endowed countries.

The globalization makes the labor market more competitive, the level of labor's real wages is more associated with their marginal products. Alternative views of wages also emphasize the role of firm-specific human capital and the effect of different incentive provision on the wages. This may have stimulated the productivity of workers. Further, the developed countries are facing the low growth of population. Increasing female labour force participation would mitigate the demographic headwinds from a falling population. In the long-term, labour markets are supply driven. Hence, shortages in labour supply may reduce employment and economic growth. Productivity growth and/or expansion of labour force participation may counter this negative spiral. Accordingly, one of the main current objectives of the EU is the twin goals of increasing participation in the labour market and growth in labour productivity.

III. Methodology and Data Sources

Methodology

This study focuses on the impact of the globalization on labour productivity in OECD countries. The empirical analysis includes 34 countries over the period 1990–91 to 2011–12. In the recent economic development literatures, panel data analysis has become popular in estimating the productivity across regions and countries (see e.g. Islam, 1995; Griffith, Redding and Reenen, 2004; and Heshmati and Shiu, 2006). The main reason lies in its ability to allow for differences or heterogeneity in the aggregate production function across economies, which is significantly different from those obtained from single cross-country regression. That means, the panel data model controls the individual heterogeneity of the countries, has more degree of freedom and efficiency (Baltagi, 2001). In the panel data econometrics, in addition to those unobservable individual factors absorbed by the independent variables, the error term (ε_{it}) can be decomposed into $\varepsilon_{it} = \mu_i + u_{it}$, where μ_i denotes unobserved region-specific effects and u_{it} is the random error component with distribution $N(0, \sigma2)$. Nevertheless, conventional cross-country methods neglect the error terms of μ_i, which makes the parameter biased. The estimable equation in panel data method framework can be written as below.

$$Y_{it} = \alpha + \beta X_{it} + \theta Z_{it} + \mu_i + \varepsilon_{it}$$

i=1, ……………, 34 and t = 1990-91, 1991-92 …………………………, 2011 - 12.

Y_{it} is labour productivity of region, X_{it} is the vector of globalization variables, Z_{it} is the vector of other explanatory variables. And α, β and θ are the parameters of the model.

There are three types of panel models. They are (a) pooled regression model (PRM), (b) fixed effects model (FEM) and random effects model (REM). Diagnostic tests such as Breusch and Pagan Lagrange Multiplier (LM) Test and the Hausman (H) Specification Test are used to choose between panel data models. The LM test is used to test the null hypothesis of the non-random individual effect. A high value of LM favours the fixed effect model or random effect model over the pooled regression model. The Hausman specification test is used to test null hypothesis of zero correlation between State-specific effects and the explanatory variables. The significance of the LM test statistics indicates that the models estimated by using REM or FEM give better estimates than PRM. Further, the statistical significance of H test suggests preference for FEM rather than REM. The standard statistical frameworks for estimation of these models are well known (Greene, 2006; Baltagi, 2001).

Data Sources

For the empirical part of this paper, we compiled published data obtained from both the OECD Statistics and World Development Indicators (WDI) of World Bank for the period of 1990-2011. The raw data set comprises a number of variables. These include the following variables for 34 countries of OECD for the recent 22 years: total number of employment, GDP (constant 2000 USD), Expenditure in education in constant USD, Investment in fixed asset in constant USD, Total industry value (IND), total service sector value, FDI net inflows, exports in constant USD, Imports in constant USD, annual average wage, female labour force participation rate, employment with the level education. We transform the raw data and define several new variables for the estimation part. This includes Labor productivity (LABPRO), Capital intensity (INV), Education expenditure per labor (EDU), Share of industry (SIND), Share of service (SSERV), Female labor participation (FLFP) in the labor market, share of employment with secondary education (SEDLF), share of employment with Tertiary education (STEDLF) and share of employment with higher education (secondary + tertiary).

IV. Preliminary Analysis

Aggregate Labour Productivity

The state of pattern of labour productivity level (LP) of global economy is presented in Table 1. The labour productivity level is defined as the GDP per the employment engaged in the production activity. The labour productivity of world economy was 10.4 thousand in 1991-92, which is increased to 11.7 and 13 in 2001-02 and 2011-12 respectively. The level of labour productivity varies across the regions in the world economy. The labour productivity of world economy is much lower than the OECD and European member countries. The labour productivity of OECD economies is the highest among the other regions. Further, the labour productivity also varies within the regions. For instance, the labour productivity in European area is 41.00 thousand, while it is 34.2 thousand in case of all European Members. Similarly, the level of labour productivity varies within the OECD regions as well.

Table 1: Labour Productivity (LP) in Global Economy

LP (in 000)	1991	2001	2011
World	10.4	11.7	13.0
Euro area	41.0	47.7	49.4
European Union	34.2	41.7	44.7
OECD members	43.4	51.2	55.2

The labour productivity levels of OECD countries in 1991-92 and 2011-012 are presented in graph.1. It is observed that, there is high variation of productivity among the OECD countries. Luxembourg was ranked first in terms of labour productivity in 2011-12, followed by US, Japan, Norway, Switzerland and others. Estonia, Hungary, Mexico, Poland and Chile and others are in the bottom in terms of productivity in 2011-12. However, it is

observed that there is no significant change in ranks of the countries in terms of productivity from 1991-92 to 2011-12. The change occurs within the top 17 countries (i.e. 50 % of the OECD countries). The remaining 17 countries are remained to be ranked at the bottom half in terms of productivity. In consequences the inequality in labour productivity has not declined in the OECD countries during this period of study. The inequality in labor productivity of OECD countries is plotted and compared with BRICS (Brazil, Russia, India, China and South

Graph1: labour Productivity level in 1991-92 and 2011-12

1991-92		2011-12	
Luxembourg	82.4	Luxembourg	116.0
Japan	68.6	United States	81.4
Switzerland	60.1	Japan	79.5
Norway	59.5	Norway	77.1
United States	58.7	Switzerland	71.1
Belgium	50.9	Sweden	68.4
Israel	48.3	Ireland	66.7
Iceland	47.6	Denmark	63.2
Denmark	47.4	Iceland	63.1
France	47.1	United Kingdom	59.8
Netherlands	44.5	Finland	59.7
Italy	44.4	Belgium	59.3
Austria	44.0	Israel	58.1
Sweden	43.9	France	55.2
Germany	43.4	Austria	55.0
Ireland	43.3	Germany	53.9
United Kingdom	42.4	Netherlands	52.2
Canada	40.0	Australia	50.9
Finland	38.8	Canada	50.2
Australia	38.7	Italy	49.8
Spain	33.7	Spain	39.1
Greece	26.7	Korea, Rep.	34.1
New Zealand	25.1	Greece	32.5
Slovenia	19.5	New Zealand	29.1
Portugal	19.4	Slovenia	27.3
Korea, Rep.	16.9	Portugal	25.3
Mexico	14.2	Slovak Republic	20.1
Turkey	10.1	Turkey	17.4
Czech Republic	10.1	Czech Republic	17.0
Chile	9.6	Chile	16.2
Slovak Republic	9.1	Poland	15.8
Hungary	8.8	Mexico	15.0
Poland	6.1	Hungary	14.9
Estonia	4.4	Estonia	14.3

Africa) countries in graph 2. The inequality is measured as the standard deviation of labour productivity among the 34 countries. The graph shows that, the inequality in OECD countries is higher than that of BRICS countries. It is important to notice that, the slope of inequality is negative in both OECD and BRICS, which indicates that the inequality among the OECD countries has been declining. However, there is huge difference in the magnitude of slopes of inequality in OECD and BRICS regions. The rate of declining of inequality in OECD region is much slower than the BRICS countries.

Graph 2: Trends in Inequality of labour productivity
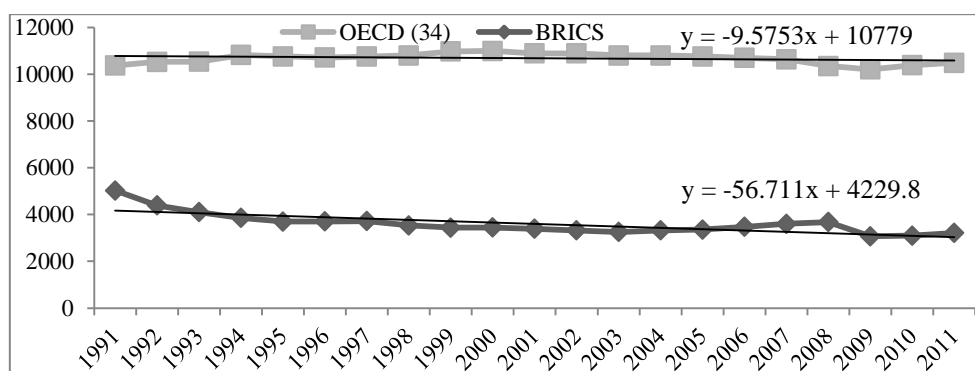
Table 2: Labour Productivity Growth (in %) in OECD

Country	1991-2001	2001-2011	1991-2011
Luxembourg	3.1	0.4	1.7
United States	1.9	1.4	1.6
Japan	0.8	0.7	0.7
Norway	2.3	0.3	1.3
Switzerland	0.9	0.8	0.8
Sweden	2.7	1.8	2.2
Ireland	3.1	1.2	2.2
Denmark	2.1	0.8	1.4
Iceland	1.4	1.4	1.4
UK	2.4	1.0	1.7
Finland	2.9	1.4	2.2
Belgium	1.3	0.3	0.8
Israel	1.2	0.6	0.9
France	1.3	0.2	0.8
Austria	1.6	0.6	1.1
Germany	1.7	0.5	1.1
Netherlands	0.8	0.8	0.8
Australia	1.8	0.9	1.4
Canada	1.9	0.4	1.1
Italy	1.8	-0.7	0.6
Spain	0.9	0.6	0.7
Korea, Rep.	4.0	3.1	3.5
Greece	1.2	0.8	1.0
New Zealand	1.3	0.1	0.7
Slovenia	1.4	1.9	1.7
Portugal	1.9	0.8	1.3
Slovak Republic	4.3	3.6	4.0
Turkey	2.0	3.5	2.7
Czech Republic	2.4	2.8	2.6
Chile	4.3	1.0	2.6
Poland	6.9	2.6	4.8
Mexico	0.3	0.3	0.3
Hungary	3.3	1.9	2.6
Estonia	8.6	3.2	5.9
OECD	1.7	0.8	1.2
World	1.2	1.1	1.1

The annual labour productivity growth in OECD countries is presented in Table 2. The productivity growth in 1991-2011 is 1.2 %. The productivity growth in 1991-2001 is 1.7 %, and declined to 0.8 % in 2001-2011, which could be due to the recent financial recessions in

the OECD and advanced countries. Estonia, who is in the bootom in terms of level of labour productivity, acquires highest growth of labour productivity in 1991-2011. The simple correlation between the levels of productivity in 1991-92 with the growth of labour productivity in 1991-2011 is found to be -0.59. This correlation coefficient indicates that, the low productivity countries are achieving higher growth of productivity than the high productivity countries. Nevertheless, the growth of productivity in OECD is also higher than that of the world economy during this study periods.

Table 3: Labour productivity (in 000) of OECD and Global Economy

Labour productivity	Agriculture		Industry		Service	
	1991	2011	1991	2011	1991	2011
EU	11.5	22.5	32.6	47.5	39.1	45.1
OECD	12.3	15.4	45.3	59.5	47.6	57.3
World		1.2		14.1		20.6
Australia	25.5	35.2	49.0	47.8	36.2	52.5
Austria	20.5	15.9	38.2	61.4	51.5	55.5
Belgium	38.6	30.5	49.2	55.3	52.6	60.9
Canada	25.5		52.0	74.9	37.2	43.4
Chile	5.0	5.3	14.6	27.6	8.8	14.0
C Republic	7.5	13.0	9.6	16.0	11.0	17.8
Denmark	31.1	31.1	43.9	69.2	50.8	62.7
Estonia	0.0	11.5	0.0	12.9	0.0	15.3
Finland	25.3	41.4	41.3	76.2	39.6	56.0
France	31.5	33.6	43.6	0.0	50.1	58.6
Germany	14.2	29.3	39.4	53.2	48.5	54.7
Greece						
Hungary	5.3	11.0	8.0	15.1	10.6	15.2
Iceland	57.2	82.5	56.2	87.7	42.6	56.8
Ireland	29.2	14.2	53.0	112.5	41.8	58.8
Israel	0.0	0.0	0.0	0.0	0.0	0.0
Italy	18.8	25.5	42.9	44.0	48.8	53.5
Japan	20.1	24.9	74.5	86.0	71.4	81.5
Korea, Rep.	8.2	14.0	20.0	78.7	17.5	26.0
Luxembourg	26.1	29.5	67.0	122.4	92.2	121.0
Mexico	4.0	4.3	17.2	21.5	18.3	14.8
Netherlands	42.0	40.9	51.1	81.5	42.7	54.2
New Zealand	18.4	24.8	28.6	34.5	25.0	27.9
Norway	34.3	49.7	84.8	157.5	53.5	57.8
Poland	1.6	4.4	8.0	16.5	7.4	18.0
Portugal	8.9	5.7	15.8	21.1	25.7	30.7
S Republic	5.1	24.2	13.8	18.9	6.2	20.6
Slovenia	10.6	7.6	19.9	26.5	21.2	30.8
Spain	16.4	25.4	33.6	46.8	37.1	37.7
Sweden	44.4	59.6	45.4	90.6	43.3	63.3
Switzerland			61.3	87.4		
Turkey	3.3	6.6	16.3	18.3	16.2	22.1
UK	33.3	36.0	43.9	67.7	42.7	58.8
US	38.3	60.2	61.4	97.6	58.5	79.0

Sources: Author's calculation using World Bank Data

Sectoral Productivity

Therefore, there is the problem of inequality in the productivity within the OECD regions, but as a whole, productivity in OECD is higher than the world economy. Then, we need to

explore how productivity is different in its economic activities. Productivity in the OECD is sourced from both the industrial and service sector activities. The labour productivity is 15.4, 59.5 and 57.3 in the agriculture, industrial and service sector activities, respectively. Hence, the country with higher share of non-agricultural income is having higher productivity in the OECD regions. The countries with relatively higher share of agriculture in national income are having lower level of aggregate productivity, which is mainly due to very low productivity in agricultural sector. For instance Turkeys' share of agriculture in income is about 16 %. But the share of agriculture in total employment is about 47.8 % (see, Appendix table 1). Further, it is obvious that, the more developed countries are using advanced technology in the production of agriculture, industry and service sector output.

**Table 4: Economic Structure of OECD and Global Economy**

Value added share	1991			2011		
	Agriculture	Industry	Service	Agriculture	Industry	Service
European Union	3.2	32.3	64.6	1.5	25.6	72.9
OECD	2.7	31.0	66.3	1.4	24.1	74.4
World	5.0	32.0	62.9	2.8	26.3	70.9
Australia	3.6	30.1	66.3	2.3	19.8	77.9
Austria	3.4	32.1	64.5	1.5	29.0	69.4
Belgium	2.0	29.4	68.6	0.7	21.7	77.7
Canada	2.7	29.2	68.0	1.9	32.0	66.1
Chile	9.9	40.1	50.0	3.4	39.1	57.5
Czech Republic	5.7	40.8	53.5	2.3	36.2	61.5
Denmark	3.7	25.3	71.0	1.2	21.8	77.0
Estonia	0.0	0.0	0.0	3.5	28.9	67.6
Finland	5.7	30.3	64.1	2.9	29.2	67.9
France	3.5	26.9	69.6	1.8	19.1	79.2
Germany	1.4	36.6	62.0	0.9	27.9	71.2
Greece	0.0	0.0	0.0	0.0	0.0	0.0
Hungary	9.7	32.6	57.7	3.5	31.0	65.4
Iceland	12.3	30.6	57.2	7.2	25.1	67.7
Ireland	8.1	34.5	57.4	1.0	31.9	67.1
Israel	0.0	0.0	0.0	0.0	0.0	0.0
Italy	3.6	31.0	65.5	1.9	25.2	72.9
Japan	2.0	37.3	60.7	1.2	27.4	71.5
Korea, Rep.	7.9	42.6	49.4	2.7	39.2	58.1
Luxembourg	1.0	24.7	74.2	0.3	13.4	86.3
Mexico	7.5	28.0	64.4	3.8	36.5	59.7
Netherlands	4.3	28.9	66.8	2.0	23.9	74.2
New Zealand	7.8	27.1	65.1	5.6	24.8	69.5
Norway	3.3	33.1	63.6	1.6	40.2	58.2
Poland	6.6	47.3	46.1	3.5	31.6	64.8
Portugal	8.0	27.3	64.7	2.4	23.1	74.5
Slovak Republic	5.7	60.1	34.2	3.9	34.9	61.2
Slovenia	5.8	45.0	49.2	2.5	31.6	65.9
Spain	5.2	32.9	61.9	2.7	26.1	71.2
Sweden	3.3	29.2	67.4	1.8	26.3	71.8
Switzerland	0.0	30.8	0.0	0.0	25.9	0.0
Turkey	15.8	32.7	51.5	9.1	27.9	63.0
United Kingdom	1.7	32.2	66.1	0.7	21.6	77.7
United States	1.9	26.7	71.4	1.2	20.0	78.8

Sources: Author's calculation using World Bank Data

V. Empirical Analysis

The impact of globalization on productivity and inequality is debated issues among the academicians. Globalisation is measured by using GDP inflows and Trade as percentage of GDP. The distribution of FDI net inflows in percentage of total FDI net inflows in the world is presented in the graph 3. Due to the globalization and integration of global economy, the structural change is occurring. OECD country is dominating in terms of its share in world FDI net inflows, which is about 78 % in 1991 and consistently declined over the periods to 52 % in 2011-12. Similarly the share of European Union countries is 49 % in 1991 and consistently declined over the periods to 25 % in 2011-12. However, major share of FDI flows to Euro Areas with the Europe as well. The same trend is observed at the country level, such as, France, US and UK (See, Appendix Table 2). The declining trend of the major advanced and developed is due to the globalization and integration of world economy due to several liberalization measures in trade, employment, investment promotional policies and administration policies at the international level.

Graph 3: Distribution FDI net inflows in Global Economy
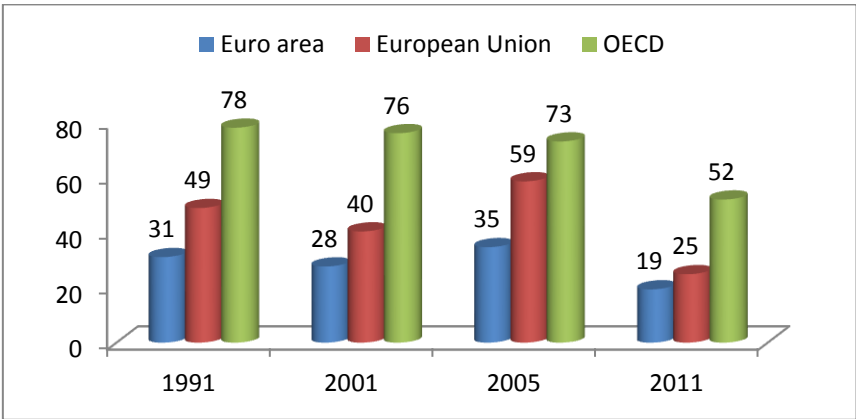
In relative term, that means in terms of the FDI net inflows as percentage of GDP, there is significant increase from 1991-92 to the current years in the world and all the regions, as revealed in the graph 4. The FDI net inflows in the OECD countries was 0.6 percentage of GDP in 1991, which is increased to 2.8 per cent in 2005, and declined to 1.9 per cent, which could be due to the financial recession during the recent years. There is high variation in FDI inflows across the OECD regions as seen in terms of absolute size i.e. Share in world FDI inflows and relative terms i.e., FDI inflows ratio in GDP in graph 5.

Graph 4: Distribution FDI net inflows in Global Economy
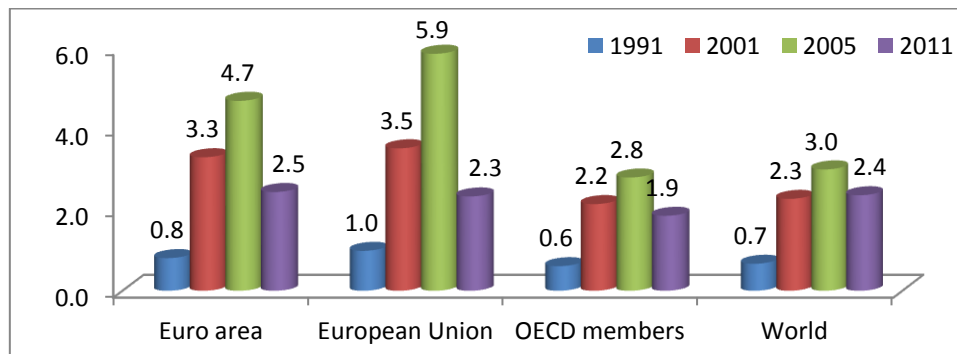
Graph 5: Distribution of FDI net inflows by absolute and relative sizes in OECD regions
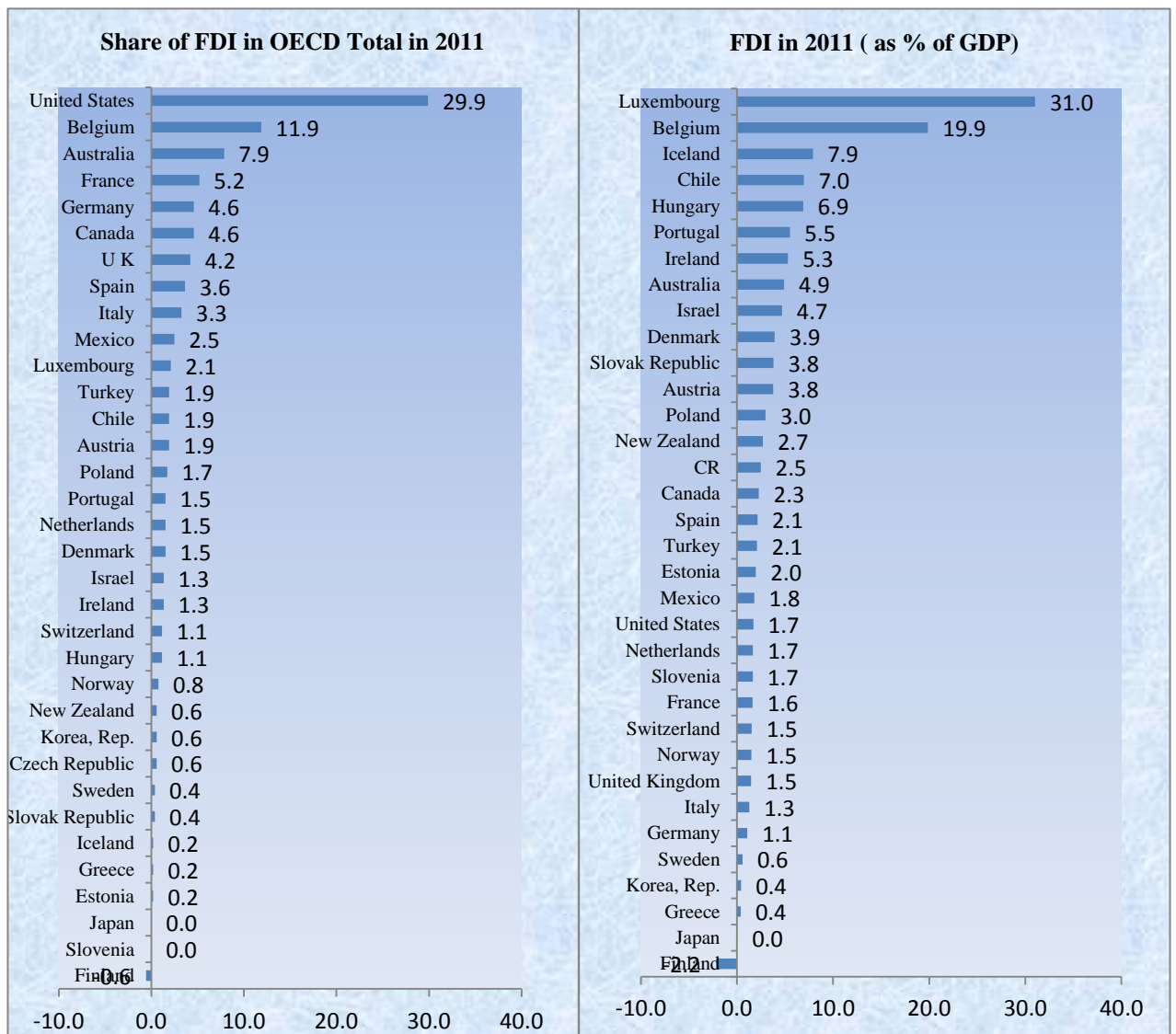
Similarly, the share of trade in GDP in OECD regions has been increased significantly from 34.5 % in 1991-92 to 53.6 % 2011-12 (see, appendix table 5). Correspondingly, it has increased in the world, European Union and Euro Areas. This trend shows the importance of

globalization in terms of trade in growth and development of global economy. Though OECD regions are the developed economies, the variation in terms of trade is found to be very high with the OECD as seen in graph 6.

Graph 6: Trade in percentage of GDP in the OECD countries
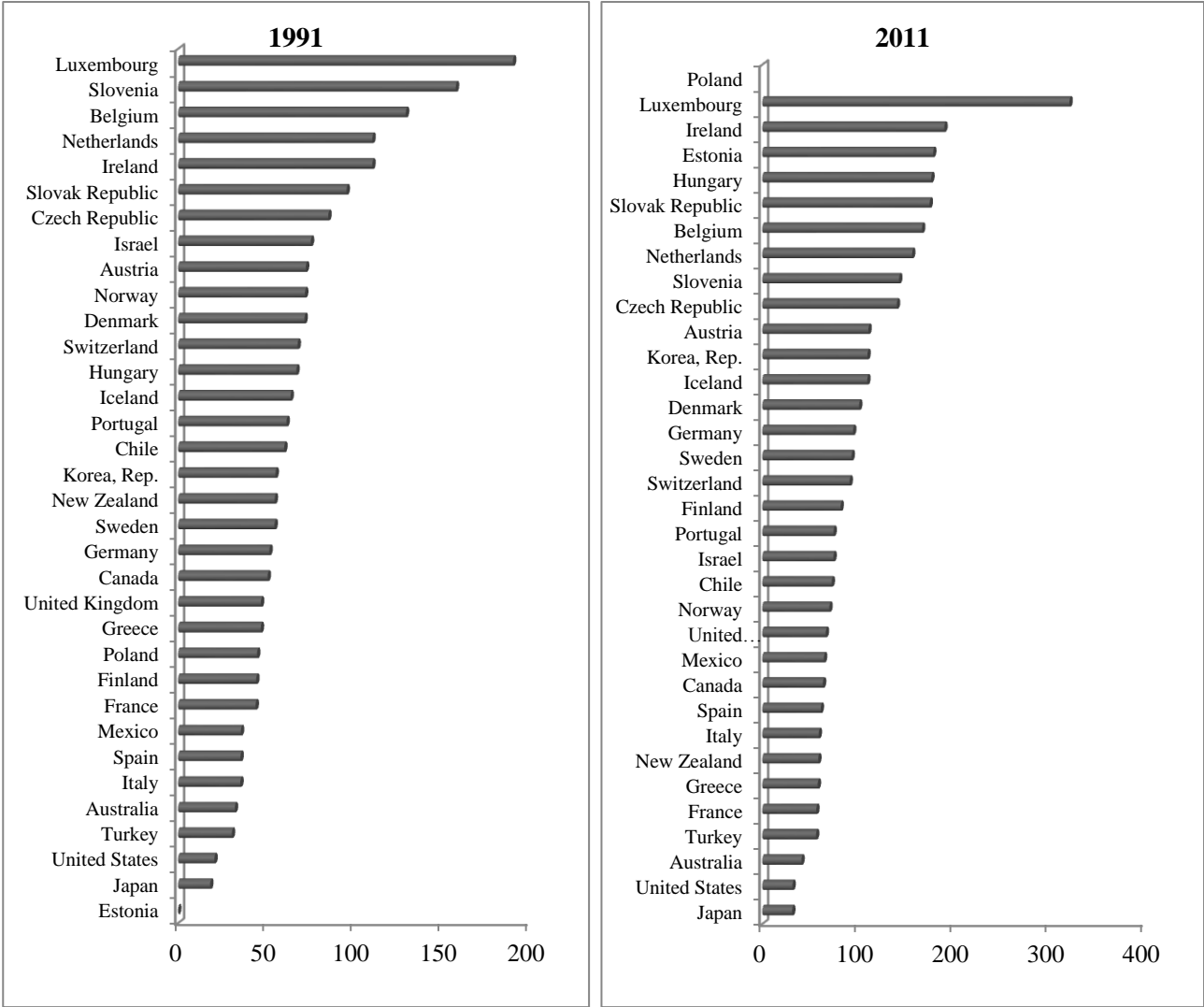
This paper focuses on the impact of globalization on labour productivity in the OECD regions. The productivity level is measured by GDP per person engaged and GDP per hour worked for the empirical analysis. Two sets of empirical results are presented in Table 5. Annual average real wage is considered as the determinant factor of productivity. OECD Statistics provides comparable data on wage for 29 countries of OECD. Hence, the first set of results is based on 29 OECD countries. However, the same equation is estimated for all the OECD countries without the independent variable wage, and presented in the Table 5. All equations are estimated by using the fixed effect model, as the values of LM (Lagrange multiplier) and H (Hausman) statistics are significant. Further, the F-statistic for the region-

specific coefficients is significant at 1 per cent, which indicates that the region-specific effects explain the productivity difference of OECD countries over the period 1990–91 to 2011–12.

Table 5: Impact of globalisation on labour Productivity

Independent Variables	OECD 29 Countries		OECD 34 Countries	
	LP	LPH	LP	LPH
Globalisation				
FDI	0.02 * (3.1)	0.03*(4.07)	0.02** (1.84)	0.02* (3.04)
Trade	0.04* (7.07)	0.03*(6.26)	0.05*(8.56)	0.03* (7.81)
Economic Factors				
INV	1.08 *(14.09)	0.65*(11.27)	1.27* (20.44)	0.75 * (15.51)
SSERV	0.04** (2.03)	0.01**(2.02)	0.165* (0.03)	0.08*(3.26)
EDUE	3.0 *(8.96)	2.23*(8.39)	3.52 * (12.71)	2.47* (11.44)
Labour Factors				
Wage	4.45 *(11.54)	0.31*(9.62)		
FLFP	0.13 *(4.46)	0.20*(8.71)	0.12* (4.41)	0.19* (8.48)
LFTED	0.07 *(3.35)	0.05*(3.12)	0.12* (5.83)	0.09* (5.6)
F-test	408.85 *	331.05	397*	325*
R^2	0.85	0.82	0.80	0.76
LM-test	1522*	2389*	1119*	2271*
h-test	473*	225**	2565*	2704*
State specific Factor (H0: All u$_{i=0}$	80.53*	77.28	76.33 *	78.66 *
No. of observation	638	638	748	748

Note: * and ** indicates statistically significant at 1 percent and 5 percent levels.
Source: Author's calculations using STATA 12

Firstly, the globalization factors are found to have significant influence on labour productivity in OECD regions. The estimation shows that the coefficient of globalization factors including FDI and trade are statistically significant at 1 per cent level of significance, with positive sign. The results suggest that, the globalization has positive impact on productivity in the OECD regions. All the economic factors included in the analysis are found to be statistically significant in explaining the variation in productivity in the OECD regions over the period of 1990-91 to 2011-12.

Secondly, the study includes the capital intensity, public expenditure on education and economic structure i.e. share of industrial sector and share of service sector in income, as the economic factors which explain the productivity differences in OECD regions during the globalization period. The regression coefficients of investment per employment (INV), economic structure or composition of income by activity (SSERV) and education expenditure per employment (EDUE) are statistically significant with the expected positive signs. However, the share of industry is not statistically significant, which could be due to the post-industrial phases of development. Recent state of OECD regions development is characterized as a post-industrial society economy with the key importance of theoretical knowledge and

prevailing service sector over the production sector, which pushing the productivity.

Thirdly labour factor, including annual average wage, employment with higher tertiary education (LFTED) and share of female in the total employment (FLFP) are statistically significant in explaining productivity difference during this period. The coefficient of labour wage is found to be statistically significant and positive in the estimation result. Hence, higher the labour wage rate, the higher will be the labour productivity in the OECD regions and vice versa. Similarly all other components of labour factors also influence the positively to the labour productivity in the OECD regions.

Table 6: Trend of Labor Productivity

High Labour Productivity Regions	LP	LPH	Low Labour Productivity Regions	LP	LPH
Austria	0.66	0.49	Australia	0.65	0.68
Belgium	0.51	0.37	Canada	0.53	0.66
Denmark	0.80	0.49	Chile	0.34	0.54
Finland	1.06	0.69	Czech	0.37	0.60
France	0.41	0.46	Estonia	0.54	0.52
Germany	0.54	0.56	Greece	0.51	0.55
Iceland	1.05	0.68	Hungary	0.31	0.49
Ireland	1.29	1.13	Italy	0.23	0.57
Israel	0.50	0.36	Korea	0.87	0.54
Japan	0.69	0.64	Mexico	0.07	0.46
Luxembourg	2.29	1.73	News land	0.22	0.63
Netherlands	0.00	0.00	Poland	0.47	0.52
Norway	1.02	0.88	Portugal	0.29	0.76
Sweden	1.20	0.72	Slovak	0.53	0.59
Switzerland	0.58	0.45	Slovenia	0.52	0.63
UK	0.96	0.67	Spain	0.13	0.67
US	1.19	0.72			

Though OECD regions are developed economies, there is high variation in terms of labour productivity, economic and labour factors, and policies with various state specific natures of economies. Hence, all the OECD countries are grouped into two regions based on the level of productivity i.e. high productivity regions and low productivity regions. Also the labour productivity grows at different rate within the OECD economies as seen from Table 6. The slope of productivity over the period of 1990-91 to 2011-12 is presented in Table 6. The slope of productivity in Luxembourg, US, Sweden, Finland, Ireland and Iceland are found to be very high within the high productivity regions. However, the slope in low productivity regions is found to be relatively lower than the high productivity regions.

Table 7: Relationship of Globalisation and Productivity

High Labour Productivity Regions	FDI	Trade	Low Labour Productivity Regions	FDI	Trade
Austria	0.34	0.97	Australia	0.34	0.81
Belgium	0.76	0.88	Canada	0.44	0.43
Denmark	0.07	0.90	Chile	0.68	0.65
Finland	0.34	0.94	Czech	0.16	0.85
France	0.62	0.92	Estonia	0.72	0.76
Germany	0.21	0.88	Greece	0.09	0.69
Iceland	0.64	0.79	Hungary	0.33	0.90
Ireland	0.56	0.79	Italy	0.31	0.74
Israel	0.68	0.14	Korea	-0.03	0.89
Japan	0.42	0.93	Mexico	0.15	0.30
Luxembourg	0.29	0.94	News land	-0.45	0.29
Netherlands	0.00	0.00	Poland	0.66	0.49
Norway	0.58	0.06	Portugal	0.37	0.72
Sweden	0.18	0.96	Slovak	0.41	0.78
Switzerland	0.47	0.98	Slovenia	0.39	0.30
UK	0.44	0.77	Spain	0.04	0.64
US	0.45	0.87			

Sources: Author's calculation

Table 8: Impact of globalisation on labour Productivity by Regions

Independent Variables	High Productivity Regions		Low Productivity Regions	
	LP	LPH	LP	LPH
Globalisation				
FDI	0.03** (3.5)	0.03* (4.64)	0.03** (1.21)	0.02** (1.5)
Trade	0.1*(8.62)	0.07* (7.48)	0.01** (2.08)	0.01*(4.91)
Economic Factors				
INV	1.12* (12.27)	0.67 * (9.51)	1.8 *(19.71)	0.84*(16)
SSERV	0.31* (4.59)	0.16*(3.08)	0.06* (1.45)	0.04**(2.3)
EDUE	1.26 * (3.13)	0.88* (2.84)	7.37 *(12.87)	2.17*(6.33)
Labour Factors				
Wage	34.78*(4.82)	22.3* (6.23)	0.0000 (1.4)	0.000(0.05)
FLFP	0.05** (2.02)	0.12* (3.28)	0.07 (2.08)	0.08(4.1)
LFTED	0.22* (4.79)	0.22* (6.23)	0.005 (0.23)	0.006(0.56)
F-test	349.31*	329.25*	134*	137*
R^2	0.90	0.89	0.81	0.80
LM-test	728*	1619*	346.24*	524*
h-test	10.74	16.19**	204*	223.48*
State specific Factor (H0: All $u_{i=0}$	82.16*	96.39	53*	65.18*
No. of observation	352	352	286	286

The simple correlation results of productivity with globalization and other factors in case of high productivity regions and low productivity regions are presented in tables 7. The labour productivity is positively associated with the globalization factors in case of all the 17 high productivity regions. Also, except Korea and News land the positive relationship of

globalization with productivity exists in low productivity regions. The fixed method of panel data estimation also provides the same results as regards the positive impact of globalization on labour productivity in high productivity and low productivity regions as in Table 8. However, the labour factors are statistically significant in explaining the labour productivity in the low productivity regions. Hence, the policy makers should design and revise the policy as regards the female labour force participation, education levels of the employment and wage in order to push the productivity at higher speed, which will reduce the productivity differences and income inequality.

VI. Conclusions and Policy Implications

Labor productivity is a multifaceted issue that is essential for the general economic performance and other issues in the labor market such as labor demand and employment. This paper empirically investigates the relationship between globalistion and labour productivity in OECD countries based on data of World Bank and OECD statistics. Specifically, panel data model with fixed effects are applied on the country level data for the period from 1990-91 to 2011-12.

The main objective of the study is to examine the impact of globalization on labour productivity. The study finds that there exists the variation of labour productivity within the OECD regions. The globalization factors are very influential for the labour productivity in the OECD regions as a whole, high labour productivity regions and low productivity regions. FDI inflow brings technology and expertise from the country of origin is successful in enhancing labour productivity in the OECD regions.

Along with globalization, the several other factors also influence the labour productivity in OECD regions, such as, economic factors and labour factors. We find out that the economic factors including the share of service sector output, investment in fixed asset and education expenditure are significantly influence labour productivity. Whereas, the share of industry does not exert any significant influence on productivity, as the OECD region is facing the state of post-industrialisation phase where the service sector is the dominating factor of income and growth.

This study considers the annual average wage, the labour force with tertiary education and female participation in labour force as the labour factors, which influence the labour productivity. Among the explanatory variables, the female labour force participation displays the effect on labor productivity, which suggests the heterogeneity in gender. Our results also suggest that employers can increase productivity by paying higher wages. Government may

encourage enterprise to use wage as one of the tools to promote workers' productivity. It is worth to note that this suggestion certainly increases the production costs and the extent to which doing so affects profits or economic efficiency would be an interesting topic for future research. However, higher labor productivity will enhance the competitiveness of the OECD products at the national and international markets. The study also found the importance of human capital which is presented by the level of education of employment or the employment with the tertiary education has crucial role in pushing the productivity. The labour factors are significant in case of high labour productivity regions, but, not significant for the low productivity regions of OECD regions. To ensure and encourage the high labour productivity achievement, relevant policies related to knowledge must be formulated an incentive to encourage investment in human capital, technology and innovation. Hence, to reduce the differences in productivity among the OECD regions, it is very important deal with the female labour force participation wage and education level of employment. In short to reduce the differences in productivity among the OECD regions, the low productivity regions need to improve the productivity in service, promote international trade and FDI, are recommended.

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Appendices

Appendix Table 1: Employment structure in OECD and Global Economy

		1991		2011	
	Agriculture	Industry	Service	Industry	Service
Euro area	7.3	33.7	59.0	24.6	71.5
EU	9.5	33.8	56.4	24.1	72.2
OECD	9.7	29.7	60.4	22.4	71.8
World	40.5	22.7	36.2	24.4	44.9
Australia	5.5	23.8	70.7	21.1	75.5
Austria	7.4	36.9	55.2	26.0	68.7
Belgium	2.6	30.4	66.3	23.2	75.5
Canada	4.3	22.5	73.2	21.5	76.5
Chile	19.1	26.3	54.6	23.0	66.4
Czech Republic	7.7	42.9	49.3	38.4	58.6
Denmark	5.6	27.3	66.3	19.9	77.6
Estonia	19.3	37.0	43.7	31.9	62.9
Finland	8.7	28.4	62.8	22.9	72.4
France	5.3	29.1	65.5	22.1	74.6
Germany	4.2	40.3	55.5	28.3	70.1
Greece	22.2	27.5	50.3	17.8	69.7
Hungary	16.1	36.1	47.8	30.7	64.3
Iceland	10.2	25.9	63.9	18.1	75.2
Ireland	12.0	28.2	59.4	18.9	76.2
Israel	3.5	28.6	67.2	20.4	77.1
Italy	8.4	32.0	59.5	28.5	67.8
Japan	6.7	34.4	58.4	25.3	69.7
Korea, Rep.	16.4	36.0	47.7	17.0	76.4
Luxembourg	6.3	28.6	64.9	12.7	82.7
Mexico	26.8	23.1	50.0	25.5	60.6
Netherlands	4.5	25.2	69.6	15.3	71.5
New Zealand	10.7	23.7	65.3	20.9	72.5
Norway	5.8	23.2	70.7	20.2	76.9
Poland	25.4	36.0	38.0	31.1	55.6
Portugal	17.5	33.5	49.0	28.2	60.6
Slovak Republic	10.2	39.7	50.1	37.9	58.4
Slovenia	10.7	44.1	45.1	33.0	57.4
Spain	10.7	33.0	56.3	21.8	74.0
Sweden	3.3	28.3	68.3	19.9	77.7
Switzerland	4.2	30.2	65.5	21.1	71.2
Turkey	47.8	20.2	32.0	26.5	49.4
U K	2.2	31.1	65.7	19.1	79.0
US	2.9	25.5	71.6	16.7	81.2

Source: world Bank Development Indicator

Appendix Table 2: Distribution FDI net inflows in OECD and Global Economy

FDI net Inflows (%)	1991	2001	2005	2011
Euro area	31.0	27.6	34.6	19.3
European Union	48.8	40.3	58.5	24.8
OECD	78.0	76.0	73.0	51.9
Australia	2.9	1.1	-1.8	4.1
Austria	0.2	0.8	5.9	1.0
Belgium	0.0	0.0	2.4	6.2
Canada	2.0	3.8	1.9	2.4
Chile	0.6	0.6	0.5	1.0
Czech Republic	0.0	0.8	0.8	0.3
Denmark	1.1	1.3	0.9	0.8
Estonia	0.0	0.1	0.2	0.0
Finland	-0.2	0.5	0.8	-0.3
France	10.3	6.9	6.4	2.7
Germany	3.2	3.6	3.0	2.4
Greece	0.8	0.2	0.0	0.1
Hungary	1.0	0.5	0.6	0.6
Iceland	0.0	0.0	0.2	0.1
Ireland	0.9	1.3	3.4	0.7
Israel	0.2	0.2	0.3	0.7
Italy	1.6	2.0	1.4	1.7
Japan	0.9	0.9	0.3	0.0
Korea, Rep.	0.8	0.5	0.5	0.3
Luxembourg	0.0	0.0	4.7	1.1
Mexico	3.2	4.1	1.8	1.3
Netherlands	3.8	7.1	3.2	0.8
New Zealand	0.9	0.0	0.1	0.3
Norway	-0.3	0.3	0.8	0.4
Poland	0.2	0.8	0.8	0.9
Portugal	1.7	0.8	0.3	0.8
Slovak Republic	0.0	0.0	0.2	0.2
Slovenia	0.0	0.1	0.1	0.0
Spain	8.5	3.9	2.2	1.9
Sweden	4.3	1.5	1.5	0.2
Switzerland	1.9	1.3	0.2	0.6
Turkey	0.5	0.5	0.7	1.0
U K	11.2	7.4	18.4	2.2
United States	15.7	23.0	10.0	15.6
World	100	100	100	100

Appendix Table 3: FDI net inflows (in % of GDP)

	1991	2001	2005	2011
Euro area	0.81	3.31	4.70	2.45
European Union	0.99	3.53	5.86	2.34
OECD members	0.61	2.15	2.81	1.86
World	0.67	2.28	3.01	2.37
Australia	1.32	2.18	-3.54	4.90
Austria	0.21	3.08	26.65	3.77
Belgium			8.93	19.86
Canada	0.48	3.87	2.25	2.28
Chile	2.26	5.81	5.61	6.96
Czech Republic		8.76	8.92	2.48
Denmark	1.14	5.79	4.98	3.93
Estonia		8.70	22.49	1.97
Finland	-0.19	3.00	5.56	-2.19
France	1.22	3.76	4.16	1.63
Germany	0.26	1.39	1.51	1.08
Greece	1.13	1.22	0.29	0.38
Hungary	4.29	7.48	7.71	6.88
Iceland	0.27	2.10	19.18	7.89
Ireland	2.81	9.06	23.13	5.30
Israel	0.58	1.44	3.60	4.68
Italy	0.20	1.32	1.10	1.28
Japan	0.04	0.15	0.09	0.00
Korea, Rep.	0.38	0.70	0.75	0.42
Luxembourg			172.72	31.02
Mexico	1.51	4.80	2.88	1.81
Netherlands	1.85	12.97	6.95	1.66
New Zealand	3.08	-0.57	1.36	2.68
Norway	-0.33	1.23	3.46	1.50
Poland	0.35	3.00	3.64	2.97
Portugal	2.78	5.13	2.31	5.51
Slovak Republic			4.89	3.81
Slovenia		2.46	2.72	1.65
Spain	2.23	4.63	2.70	2.13
Sweden	2.46	4.95	5.48	0.57
Switzerland	1.15	3.58	0.69	1.53
Turkey	0.54	1.71	2.08	2.07
United Kingdom	1.56	3.67	11.05	1.48
United States	0.39	1.63	1.10	1.72

Appendix Table 4: Trade in percentage of GDP

	1991	2001	2005	2011
Euro area	54.6	72.1	74.3	85.6
European Union	53.7	70.8	72.9	84.0
OECD members	34.6	43.9	46.8	53.6
World	38.4	48.2	53.6	59.1
Australia	32.2	43.9	38.8	41.1
Austria	72.5	94.0	103.7	111.3
Belgium	129.2	152.1	153.4	167.5
Canada	50.8	81.3	71.9	63.6
Chile	60.2	61.4	70.0	72.8
Czech Republic	85.2	126.7	126.1	141.1
Denmark	71.7	87.7	93.1	101.6
Estonia	0.0	162.1	161.9	179.1
Finland	44.3	73.6	79.4	82.1
France	44.0	55.6	53.4	56.7
Germany	51.8	67.6	77.4	95.3
Greece	46.9	63.3	55.7	58.2
Hungary	67.1	145.0	134.0	177.2
Iceland	63.8	78.7	75.7	110.1
Ireland	110.2	182.9	150.5	190.9
Israel	75.3	68.4	85.8	74.7
Italy	35.3	52.3	51.8	59.2
Japan	18.2	20.3	27.2	31.4
Korea, Rep.	55.3	69.2	75.8	110.3
Luxembourg	190.6	275.6	286.2	321.8
Mexico	35.6	57.3	55.7	64.7
Netherlands	110.2	128.8	130.7	157.1
New Zealand	54.8	66.9	56.9	58.7
Norway	72.0	74.6	71.9	70.4
Poland	44.8	57.8	74.9	
Portugal	61.5	66.4	64.7	74.8
Slovak Republic	95.6	153.5	157.2	175.5
Slovenia	157.8	111.2	124.8	143.5
Spain	35.4	59.6	56.6	61.3
Sweden	54.7	85.9	89.0	93.7
Switzerland	67.8	84.7	88.5	91.6
Turkey	30.5	50.8	47.2	56.4
United Kingdom	47.0	56.8	56.7	66.6
United States	20.6	23.7	26.5	31.7

Appendix Table 5: Export and Import in percentage of GDP

In % of GDP	Export				Import			
	1991	2001	2005	2011	1991	2001	2005	2011
Euro area	27.1	36.7	38.0	43.6	27.5	35.3	36.3	42.1
European Union	26.7	35.8	37.0	42.6	27.0	35.0	35.9	41.4
OECD members	17.3	21.7	22.7	26.3	17.4	22.3	24.0	27.3
World	19.1	24.1	26.8	29.3	19.3	24.2	26.9	29.8
Australia	16.0	22.1	18.1	21.3	16.2	21.9	20.6	19.8
Austria	35.9	48.1	53.8	57.3	36.5	45.9	49.9	54.0
Belgium	65.5	77.8	78.7	84.3	63.7	74.2	74.7	83.1
Canada	25.1	43.5	37.8	31.2	25.7	37.8	34.1	32.4
Chile	32.4	30.9	38.4	38.1	27.8	30.5	31.6	34.7
Czech Republic	45.9	62.6	64.4	72.5	39.2	64.1	61.7	68.5
Denmark	38.5	47.2	49.0	53.4	33.1	40.6	44.1	48.2
Estonia	0.0	79.8	77.7	91.5	0.0	82.3	84.2	87.6
Finland	21.7	41.5	41.8	40.7	22.6	32.1	37.7	41.4
France	21.8	28.4	26.4	27.0	22.2	27.2	27.0	29.8
Germany	25.7	34.8	41.3	50.2	26.1	32.8	36.1	45.1
Greece	17.4	24.9	23.2	25.1	29.4	38.4	32.5	33.1
Hungary	33.2	72.0	65.9	92.3	33.9	73.0	68.1	84.9
Iceland	31.3	38.8	31.7	59.3	32.5	39.9	44.0	50.8
Ireland	57.7	99.1	81.1	106.6	52.5	83.7	69.4	84.3
Israel	29.9	32.9	42.7	36.9	45.4	35.5	43.1	37.8
Italy	17.8	26.9	25.9	28.8	17.5	25.5	25.9	30.3
Japan	9.9	10.4	14.3	15.2	8.3	9.8	12.9	16.1
Korea, Rep.	26.3	35.7	39.3	56.2	29.0	33.5	36.6	54.1
Luxembourg	101.4	146.6	155.8	176.5	89.2	129.0	130.3	145.3
Mexico	16.4	27.6	27.1	31.7	19.3	29.8	28.6	33.0
Netherlands	57.2	67.3	69.6	83.0	53.1	61.5	61.1	74.1
New Zealand	28.9	34.6	27.4	30.0	25.9	32.3	29.6	28.7
Norway	39.9	45.8	44.1	42.1	32.1	28.8	27.8	28.3
Poland	21.5	27.1	37.1	0.0	23.3	30.7	37.8	0.0
Portugal	26.9	28.1	27.7	35.5	34.6	38.3	37.1	39.3
Slovak Republic	46.3	72.7	76.3	89.1	49.3	80.8	80.9	86.4
Slovenia	83.5	55.2	62.2	72.3	74.2	56.0	62.6	71.3
Spain	16.2	28.5	25.7	30.3	19.2	31.1	30.9	31.1
Sweden	28.2	46.3	48.4	49.9	26.5	39.6	40.6	43.7
Switzerland	34.6	44.7	47.6	51.2	33.2	40.0	40.9	40.4
Turkey	13.8	27.4	21.9	23.7	16.6	23.3	25.4	32.6
United Kingdom	23.2	27.3	27.0	32.5	23.8	29.6	29.8	34.1
United States	10.1	10.0	10.4	14.0	10.5	13.7	16.1	17.8