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Key Determinants of Job Creation:

A Comparative analysis between OECD Countries and Emerging Economies

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Summary

This study explores the key macroeconomic determinants of job creation in Organisation for Economic Co-operation and Development ("OECD") countries and Emerging economies. A panel dataset consisting of 56 countries between 1980 and 2014 was used to examine the impact of the explanatory variables on job creation. In light of the rapid increase in globalisation-induced factors over recent decades, contrary to popular belief, technology was evidenced to substitute labour in emerging economies but was insignificant for OECD countries. Productivity was significant and positive for just the OECD countries. However, the study is unable to provide sufficient evidence of Foreign Direct Investment (FDI) or inflation being significant determinants of job creation. The practical implications of the results are that it dismisses theories suggesting productivity results with job losses. The study also provides further evidence supporting several research by observing the detrimental effects of minimum wage policies on employment. Furthermore, economic growth remains a significant determinant of job creation.

Keywords: Labor Economics, Job Creation, Technology, Minimum Wage, Economic Growth.

JEL: E24, J01, J21, J23, O14.

1. Introduction

Job creation is amongst the biggest challenges facing modern economies as global unemployment rates are at historically high levels[1], despite witnessing over the last few decades, rapid advances in Technology, Productivity and Foreign Direct Investment (FDI). During the same period, the global economy has also experienced strong and persistent economic growth. This contrasts with a fundamental macroeconomic principle, Okun Law, which postulates a negative relationship between growth and unemployment. The deviation from this principle suggests economic growth may no longer be a significant determinant of job creation in modern economies and that the Okun (1962) law is outdated.

As a result, this study will attempt to challenge existing theories in order to provide a comprehensive review of the key

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[1] Data provided by the International Labour Organisation (ILO)

macroeconomic determinants of job creation. Fifty-six OECD and emerging economies have been examined in the period between 1980 and 2014.

This study is different from previous work as it encompasses a broad range of intrinsic factors, which are theorised to have a bearing on employment. Furthermore, the econometric approach provides a mechanism to control country-specific effects, allowing simultaneous assessment of each variable. Lastly, the focus is on job creation, whereas the majority of studies on the labour economy have placed emphasis on unemployment. Results may differ when the focus shifts to job creation Garibaldi and Mauro (2000).

This study is split into five distinct sections. The first section provides a contextual background, followed by a critical literature review in the second section. The third section details the methodology used to answer the research questions, followed by the empirical results and the conclusions are presented in the fourth and fifth sections respectively.

1.1. Contextual Background

High employment is valuable to the economy, which results in several economic and social benefits. Over the past decade, OECD countries such as the United States and Australia have been successfully creating jobs, while others globally have struggled (Garibaldi and Mauro, 2000). There is a shortage of research on the reasons why certain countries are more successful than others at creating jobs, which is the main focus of this paper. Economic growth is often cited the most significant determinant of job creation, but with increased globalisation perhaps other factors, such as productivity gains, technology or FDI should be deemed to be equally as important.

The world economy grew by approximately 3.1 % in 2015, but this was less than expected. Weaknesses in emerging and developing countries are driving the slowdown in global growth ILO (2016). This suggests emerging economies are becoming increasingly important to the global economy and deserve greater attention. This weakening of the global economy has led to a peak in unemployment, now at 197 million, which is 27 million higher than pre-crisis level (ILO, 2016). Clearly, not enough jobs are being created to meet the needs of the growing population.

Figure 1 depicts the average employment rates for country classifications while Figure 2 exposes the continual growth of productivity and technology. Despite vast differences in development, geography and the labour force composition, the employment rates between the two groups follow a similar pattern. This implies that there are underlying global factors determining employment, possibly due to a rise in the globalisation factors.

Furthermore, numerous studies (Mortensen and Pissarides, 1994; Blanchard et al., 1995) suggest that productivity gains and technological advances positively impact employment. Surely, if this presumably true, their rapid growth ought to decrease unemployment. This is in direct contrast with figures 1 and 2 which show a downward trend in employment rates, providing further evidence that unemployment is at historically high levels (Stewart et al., 2015). Moreover, ILO data shows that emerging economies experienced a sharp increase in unemployment by 2.4 million in 2016. Therefore, insinuating that productivity gains and technological advances may have an adverse effect on employment levels within emerging economies.

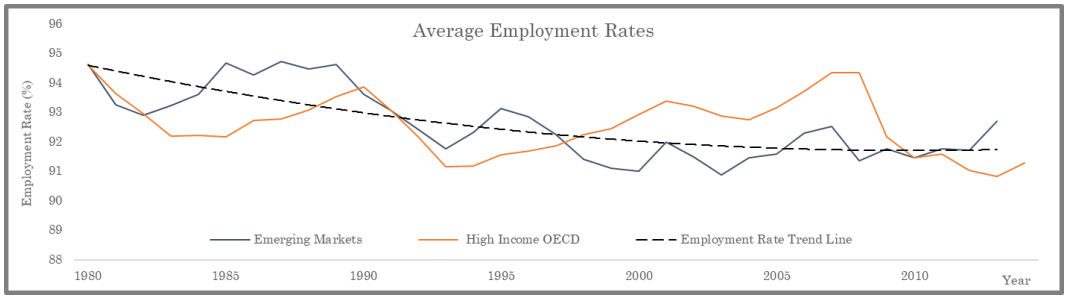
Perhaps a reason for this contradiction is the increased numbers of economies with statutory minimum wages. Between 1995 and 2014, the number of countries in this study with a minimum wage has risen from 24 to 46 (ILO, 2016). On 1 January 2015, Germany

introduced a minimum wage, while an increase in the United Kingdom's minimum wage is imminent, emphasising the importance and relevance of the issue.

1.2. Research Questions

We have evidenced the decline in employment rates for OECD countries and emerging economies. Rather than attempting to understand factors reducing the level of unemployment, understanding the key determinants of job creation may prove to be more insightful. Following this, the study will attempt to address the subsequent questions:

1. Is economic growth still a significant determinant of employment growth?
2. Do productivity gains have a positive effect on job creation?
3. Does an increase in technological progress complement or destroy jobs?
4. Does FDI have a net benefit on job creation?
5. Does inflation have any significant effects on job creation?
6. Do minimum wages negatively affect employment?



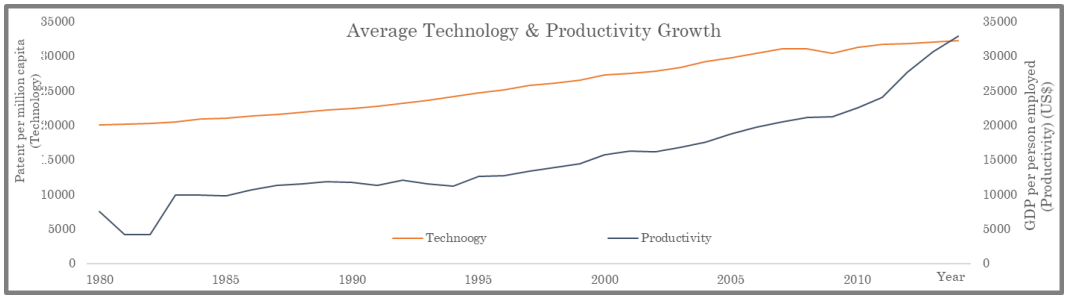


Figure 1[2]. **Figure 2[3].**

2. Literature Review

Literature regarding factors contributing to employment are discussed and critically analysed. The review is organised chronologically by topic, but there is deviation where necessary to improve the clarity of the concept

2.1. The Relationship between Economic Growth and Job Creation

There have been numerous studies on the relationship between economic

[2] Employed as a proportion of the labour force obtained from the ILO

[3] Productivity, measured as GDP per worker has been obtained from the World Bank Technology is measured as number of patents filed and recognised by WIPO

growth and employment, arguably two of the most important measures of economic performance. Okun (1962), a pioneer in the field, was one of the first economists to empirically observe the negative relationship between growth and unemployment, informally known as "Okun's law".

In a study on economic growth and job creation by Fidrmuc and Huang (2015), the researchers used a non-linear Least Square Dummy Variable (LSDV) regression between 1997 and 2006. They reported a negative and strongly significant relationship between growth and unemployment, suggesting Okun's law remains relevant in modern economies. Perhaps Fidrmuc and Huang were too quick to jump to such conclusions due to the relatively small sample size, giving rise to a potential selection bias, although, Izyumov and Vahaly (2002) and Palát (2013) also reported similar results.

A limitation of Okun's law is that it fails to acknowledge other factors, which may impact the relationship between growth and employment levels. For example, Cazes et al. (2011) note that countries with strong employee protection, make it difficult for employers to react to changes in the economic climate, dampening the impact of growth on unemployment during the business cycle. In addition, the model is unable to explain the jobless growth phenomenon, where high growth rates do not lead to similar levels of employment growth (Kabanova and Tregub, 2012).

It is important to note that Okun's law is not an empirical fact. Some studies have not been able to replicate this relationship. Kreishan (2011) studied the relationship between economic growth and unemployment in Jordan, between 1970 and 2008. The empirical results revealed that a lack of economic growth did not explain why there was an unemployment problem in Jordan - Okun's law did not hold. Jordan is a developing economy, so there is a possibility that Okun's law may not hold for emerging economies, given their often double-digit growth rates, coupled with historically high levels of employment. This study will need to identify whether the inability of Okun's law in explaining the relationship between growth rates and employment (not in line with Okun's law) is unique to Jordan, or whether this is a relationship that can only be replicated in developed economies.

In contrast to the empirical findings by Kreishan (2011) in Jordan, Sodipe and Ogunrinola (2011) confirmed that a positive and statistically significant relationship existed between the level of employment and economic growth in Nigeria, one of the emerging economies in this study. There is a possibility that this relationship is also statistically significant in emerging economies and that Okun's law continues to remain relevant. Further, Khan (2007) determined that that employment elasticity of GDP growth is 0.7 for emerging economies, providing further evidence to the body of research indicating that economic growth and job creation are highly correlated across both developed and emerging economies. Similarly, Kapsos (2005) finds that each percentage point of additional GDP growth results in a growth in total employment by between 0.3 and 0.38 percent.

Basnett and Sen (2013) undertook an extensive literature review to identify what empirical studies had to say about the relationship between economic growth and job creation, with a focus on developing countries. Their review of the empirical literature exposed that economic growth is positively associated with job creation - even in developing economies. They found that growth in non-manufacturing, such

as agri-business and related industries, contribute to job creation. These results indicate that expectations should be that economic growth is a positive contributory factor for developing economies which are more reliant on their agriculture and related business, relative to the developed economies. Basnett and Sen (2013) also arrived at the conclusion that growth in manufacturing and services has a higher impact on employment relative to agriculture, suggesting that economic growth is likely to have a far greater impact on the job creation in developed economies than in developing economies. The makeup of the developed economies is largely manufacturing and service intensive, in comparison emerging economies.

One final study on the topic with significant implications is by Melamed et al. (2011). The researchers reviewed literature on 24 growth episodes from the 1980s, 1990s and 2000s, in which there was evidence of the impact of employment in different sectors to suggest that economic growth particularly within the service industry is crucial for driving job creation. If this relationship holds true, developing economies should be expected to experience a larger increase in job creation as a result of growth in the service industry, because the service industry in emerging economies is less developed, relative to OECD economies.

2.2. The Relationship between Productivity and Job Creation

Empirical studies on the effects of productivity on job creation are inconclusive. For instance, studies by Davis and Haltiwanger (1990, 1991) and Mortensen and Pissarides (1994) report that productivity gains create jobs and that the probability of an unemployed worker finding a job is greater than that of a job being closed. Aghion and Howitt (1992, 1994), Blanchard et al. (1995) and Gallegati et al. (2014) report that periods of fast productivity growth are also periods of high employment. An explanation could be that greater worker productivity increases the marginal benefit of an additional worker to the firm, resulting in the firms increasing their demand for labour. In their study of the US manufacturing sector between 1972 and 1986, Davis and Haltiwanger (1990) reach the conclusion that there is a tremendous heterogeneity of establishment level employment changes, associated with large rates of job creation, destruction and reallocation. They further explain that the magnitude of this heterogeneity varies significantly over time. However, this study was limited to the US manufacturing industry, so their findings cannot simply be extrapolated at the macroeconomic level. This is even more pertinent, given the economic makeup of the emerging countries is vastly different to the US manufacturing industry as a subsection of the US economy.

Furthermore, Baily et al. (1996) documented at the company level that the rapid productivity growth in US manufacturing industry in the 1980s was accompanied by a substantial reduction in employment. Productivity was measured by the value added per worker, derived by subtracting the real cost of the materials from the gross output. A major drawback of this approach is that it fails to account for exogenous factors affecting the cost of materials or sale price external to the firm. Hence drawing concrete conclusions from the study may be misleading.

Similar results have also been replicated by Junankar (2013) in his analysis of the possible trade-off between employment and productivity. The study used a panel

dataset on developed and developing economies to evaluate a possible trade-off between employment and productivity. The results suggest that there is indeed a trade-off between employment and productivity. Productivity gains are expected to result in job closures. A simple explanation could be that productivity gains increase the output per worker and hence, fewer workers are required to provide the same level of output, ultimately reducing the demand for labour.

2.3. The Relationship between Technical Progress and Job Creation

Aghion and Howitt (1990) proposed that structural change induced by technology drives up the rates of job turnover and results in a higher natural rate of unemployment in a process known as "*creative destruction"*. It suggests that technology-induced restructuring destroys low-productivity jobs while creating jobs that are relatively more productive.

Sectors that are the source of technological innovation, such as software engineering and scientific research or medicine, complements labour and lowers the cost of production, giving rise to rapid expansion (Stewart et al., 2015). Based on this, firms may redistribute a share of the cost savings to the consumers, who increase spending in other sectors, such as leisure and fitness, therefore generating greater employment opportunities.

Aghion and Howitt (1994) somewhat agree to this assumption by suggesting that most of the unemployment which arises as a result of technical progress affects less skilled labour in agriculture and manufacturing, where technology substitutes routine or manual labour as skills become obsolete. However, one major drawback of the study is that Aghion and Howitt fail to measure the rate of employment growth. This obscures the true effect on employment because the negative impact does not necessarily take the form of discharging workers and increasing the unemployment rate. It may take the form of slower employment growth, which has been established by using employment growth as a dependent variable.

In 2008 the study conducted by Hall et. al. evidenced the positive effects of innovation (a proxy for technical progress) on employment growth. However, this study is only focused on the manufacturing industry in Italy, so the results may not be replicated across the OECD countries. Furthermore, similar results have also been reported in a relatively more recent study by Harrison et. al. (2014). In this study, the researchers studied the impact that company innovation has on employment growth in the manufacturing and service industry in France, Germany, Spain and the UK, between 1998–2000. Data from around 20,000 companies were used in the study. The researchers did not find any evidence of innovation having adverse employment effects. The authors reported that as a result of innovation, firms experienced market expansion via the development of new products. This was reported to have had a positive effect on the growth of employment. However, the validity of the findings should be questioned because of the short-term nature of the research. Data was only collected for a period of two years, so it is likely that there are some biases. A longer-term study is required to understand true impact of technical progress on employment levels, so this paper will aim to gather data over a 35-year period at minimum (providing the data is consistent and of a good quality).

2.4. The Relationship between Foreign Direct Investment and Job Creation

Foreign Direct Investment (FDI), often ignored by scholars with regard to job creation may increase the economy's

competitiveness internationally, boosting demand for goods and services which in turn results in jobs creation. Given the insufficient studies on the direct relationship between FDI and job creation, the literature review relies to a certain extent on their indirect relationship, through FDI's interaction with economic growth and then the well documented relationship between economic growth and job creation.

FDI is becoming an increasingly significant macroeconomic factor and merits its inclusion in this study. *"Globalisation and openness to trade, foreign investment, and innovation are widely seen as major factors in the post war growth experience"* (Barrell and Pain, 1997). It is a key driver of economic growth and economic development (Görg and Greenaway, 2003). Therefore, it may be assumed that FDI should ultimately have a direct and positive effect on job creation.

Karlsson et al. (2007) studied the effects of FDI in China between 1998 and 2004. The results confirm that China, one of the world's largest recipients of FDI, experienced significant employment growth as a direct result of FDI. Zeb et al. (2014) replicated the results, suggesting FDI creates jobs by introducing new industries and establishing new firms. Inflows of FDI introduces capital for expansion in production and ultimately job creation.

In their extensive cross-country analysis of the effects of FDI, Blonigen and Wang (2004) concluded that FDI is insignificant for developed countries, yet its effects on less developed countries are positive and significant. An explanation as to why FDI had no positive impact in the developed countries is that competition between foreign and domestic firms results in domestic firms exiting the market, therefore destroying jobs. Nevertheless, Kosova (2010) defines the "crowding out" impact of foreign firms as a short-term effect.

This contrasts with the results by Mucuk and Demirsel (2013) who used a panel unit root, cointegration and casualty tests for annual data between 1981 and 2009 and concluded that FDI increases unemployment in the long run. The contrasting results suggest that the econometric technique used by Blonigen and Wang (2004) may be simplistic and inadequate, considering that the pooled OLS method denies heterogeneity and individuality across countries. The failure to distinguish between countries by assuming all countries are intrinsically the same is likely to lead to biases in the estimates and to incorrect inferences.

Barrell and Pain (1997) explain that FDI can serve as an important channel for diffusion of ideas and innovations in developed economies, which can enhance the growth process and at the same time raise welfare by providing an additional flow of capital to stimulate an economy. These findings show that FDI may have a direct and positive effect on economic growth. Greater investment and increasing welfare in the economy is likely to produce a multiplier effect, which further accelerates economic growth. As discussed within section 2.1, there is also a direct and positive relationship between economic growth and job creation, in accordance with modern economic literature. Hence FDI is expected to increase job creations in an economy, despite its indirect relationship with GDP growth.

In another study by Li and Liu (2005), a panel of data for 84 countries over the period 1970–1999 was used to evaluate whether FDI affects economic growth. Their research concluded that a significant endogenous relationship between FDI

and economic growth existed. They were able to confirm that FDI directly promotes economic growth. However, their research only reviewed data until 1999. The impact (or significance) of FDI on economic growth is likely to have shifted over the past 20 years. Further, their research does not compare and contrast the impact of FDI between developed and developing economies. We expect the significance of FDI to be greater on developing economies than developed economies (and also its impact on economic growth), because a key challenge to economic growth and job creation in emerging economies is an absence of wealth. FDI provides wealth, which should result in job creation via the multiplier effect. FDI accelerates entrepreneurship, creates businesses, increases output, which boosts economic growth and creates jobs. It could also contribute positively to job creation if investments are made by multinational corporations that establish overseas subsidiaries. These subsidiaries are likely to require the services of local employees, which creates a direct benefit by opening jobs in these emerging economies.

Balasubramanyam et. al. (1996) studied the role that FDI plays in economic growth of developing economies. Their empirical paper used a cross-section data technique to sample 46 developing countries to conclude that FDI enhanced economic growth in developing countries. They found that this is more significant in developing economies that pursue an outwardly orientated trade policy. Although their study was very clear on the fact that FDI has a direct and positive effect on economic growth in developing economies, the relationship between FDI and job creation was indirect. Economic literature explains that economic growth creates jobs (section 2.1). Therefore, if FDI leads to economic growth, which in turn leads to job creation, one can also conclude that this study shows that FDI does have an indirect and positive effect on job creation.

Due to the absence of research studying the direct relationship between FDI and job creation, this study will aim to evaluate the existence of direct relationship between FDI and job creation, along with its significance on job creation using an empirical model. Economic literature dictates that a statistically significant and positive relationship exists between FDI and job creation.

2.5. The Relationship between Inflation and Job Creation

Phillips (1958)[4] measured inflation as the change in wages and developed the model, informally known as the *Phillips Curve*. Phillips observed a significant non-linear and negative relationship between inflation and unemployment. The model explains that when labour demand is high because of a growing economy, unemployment rate would be low. This results in increased wages, leading to demand side inflation. It is logical for reduced levels of unemployment to have a positive impact on inflation because lower unemployment rates give bargaining power to employees, who then tend to negotiate higher wages. One of the limitations of this theory is that it may be outdated because Philips used data as far back as 1861, which may no longer remain relevant for modern economies.

Several economists have raised questions regarding the Philips curve, such as Simler and Tella (1968), Perry (1970), Taylor (1970). They argue that the Phillips

[4] See appendices for the traditional Phillips curve and the Phillips curve which was adjusted to explain a potential positive relationship between inflation and job creation.

curve is inadequate in its estimations of the unemployment rate. A possible reason is that the Philips curve ignores hidden unemployment and the discouraged long-term unemployed who have given up on their search for employment. Perry also raised the issue that the composition of the labour force has been changing, with increased numbers of women and teenagers as participants. As historically there is a higher level of unemployment among these groups, their increasing participation should shift the Phillips curve, allowing the unemployment rate to be associated with higher inflation.

Moreover, Friedman (1968) suggests that the Philips curve is only a short-run phenomenon. In the long run, inflation would not reduce unemployment and the economy will operate at the Non Accelerating Inflation Rate of Unemployment (NAIRU). This means the long-run Philips 'curve' would not be a curve, but a perfectly straight vertical line. Therefore, the effects of inflation may be insignificant in the long term.

In a more recent study by Bhattarai (2016), it is suggested that in OECD countries, the rate of unemployment varies significantly amongst the economies, while the rates of inflation have stabilised at lower rates as a result of the inflation-targeting policies pursued by central banks. It indicates that the Phillips curve phenomena is still empirically significant for 28 out of 35 of the OECD economies in the country specific regressions (in a fixed and random effect panel data models, along with panel VAR model for 1990:1 to 2014:4). These results are statistically significant and conclusive. However, this study does not model a potential impact on the relationship between the employment rates and inflation within developing economies. There is a possibility that the results may differ for developing economies, which generally have a higher rate of inflation. Therefore, modelling the impact that inflation has for both developed and emerging economies, along with comparing its significance, will be crucial to this paper. For the OECD countries under review in this study, the assumption is held that, in aggregate, the Phillips curve will remain empirically significant.

2.6. The Relationship between Minimum Wages and Job Creation

Although basic economic intuition suggests that minimum wages reduce employment, recent studies report a strong increase in earnings and no adverse employment effects associated with minimum wages (Rebitzer and Taylor, 1995; Card and Krueger, 2000; Ashenfelter et al., 2010; Linde Leonard et al., 2014). An explanation is that firms raise prices, therefore offsetting the increased labour costs to consumers.

Furthermore, Dube et al. (2010) found that minimum wage has a strong earnings effect and no negative employment effects. Linde Leonard et al. (2014) concluded in their meta-regression analysis of 236 minimum wage elasticity and 710 partial correlation coefficients from 16 studies that overall there are no adverse employment effects as a result of minimum wages. A meta-analysis is a statistical technique developed to combine quantitative results from multiple studies used to provide a specialised systematic review (Greenhalgh, 2006). This approach may eliminate the possibility of selection bias, but the outcome depends entirely on the results of other studies, which may be unreliable.

Nevertheless, many of the studies suggesting that minimum wages do not have an adverse impact on employment fail to address factors such as economic growth, which may have obscured the true effects of minimum wages. Therefore, the reported

positive impact of minimum wages on employment may in fact be due to economic growth. Additionally, the five-year observation period used by Card and Krueger may be insufficient to monitor the long-term effects of minimum wages on employment.

On the other hand, neo-classical theory explains that minimum wages reduce the aggregate demand for labour, due to an increase in company marginal cost of labour. If firms aim to maximise profits, the labour market is competitive and no firms enjoy monopsony power, which would reduce employment (Stigler, 1946; Carter, 1998; Leonard, 2000). Using an efficiency wage model, Carter evidences a significant and well established negative effect of minimum wages on employment.

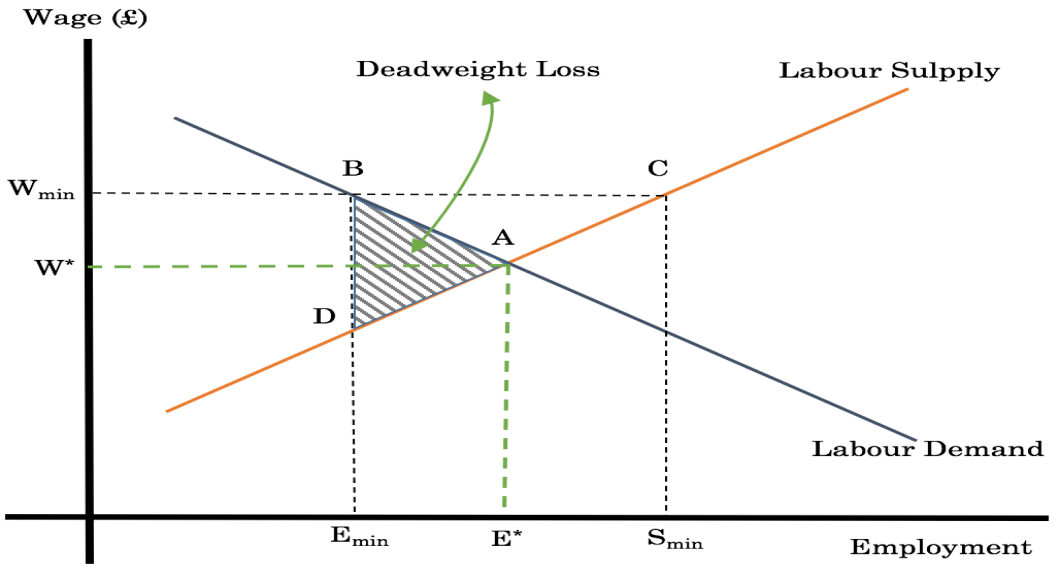


Figure 3

Figure 3 reveals a simple diagram showing the effects of a minimum wage on employment levels in a particular market. The model assumes there is a single labour market with homogeneous workers who accept wage w^*. The competitive equilibrium is at point A, where W^* and E^* are market efficient wage and employment levels. The introduction of a minimum wage increases the wage to $W_{min,}$ leading to an oversubscription of labour employment S_{min} - E_{min}. As a result, only E_{min} workers benefit from the minimum wage, which may be an explanation to the results found by Dube et al. (2010).

It must be noted that S_{min} - E_{min} does not necessarily pertain to the unemployed. For example, it includes discouraged workers who exit the labour force. Nevertheless, such a simple model fails to acknowledge the fact that workers differ in skill and wage demands.

Brochu and Green (2013) established that higher minimum wages result in lower hiring rates but also lower job separation rates, which are largely due to a reduction in layoffs. They further explain that jobs in higher minimum wage regimes are more stable but harder to get. Brochu and Green (2013) also find that minimum wage changes have *"little to no impact on employment rates for workers who are older than teenagers"*

(p. 1205). They conclude that separation rates for workers with over a year of job tenure do not vary with the minimum wage. This study provides further evidence suggesting that minimum wages does not have any adverse effect on job creation. If this is the case, one can argue that minimum wages are effective economic policies to protect the lower paid and the most vulnerable in society, without raising the cost of employment (in aggregate) within the economy.

Although Brochu and Green conclude that minimum wage policies do not have an adverse effect on the job creation of adults, it is also important to examine this relationship among younger members of the labour force, in particular teenagers, given that a greater proportion of the workforce in developing economies is younger people or teenagers, compared to the developed economies. A key study in this field was conducted by Portugal and Cardoso (2006) who studied the effect that minimum wages have on job creation among teenagers. They suggest that minimum wages impact teenagers and adults differently. Their results indicate that there is a decline in separation rates, which is offset by a decline in hiring. There is no negative aggregate effect on the economy as a result of minimum wages.

Although in their study Portugal and Cardoso study aimed to compare the impact that minimum wages have on the employment levels among teenagers and older workers, it is worth noting that in aggregate, the working population of an economy is largely made up of older workers. Teenagers are unlikely to have material effect on the labour market, particularly in developed economies, where the workforce generally comprises adults. Therefore, the significance of their findings could indicate that the developing economies are likely to be more strongly affected by minimum wage policies, as a greater proportion of their workforce is younger or are teenagers.

2.7. Summary of the Literature

Following an extensive review of economic literature, it is evident that most studies, such as Aghion and Howitt (1994) and Blanchard et al., (1995) fail to measure the rate of employment growth (or job creation). This obscures the true effect on employment because the negative impact does not necessarily take the form of discharging workers. The negative impact may instead take form through slower employment growth or not replacing workers who leave by choice. This effect may be examined by using employment growth as a dependent variable.

Additionally, a number of studies were observing the impact on unemployment in a single market, industry or country as opposed to a cross-country analysis of job creation. To fill the gaps, a cross-country analysis spanning multiple years and using employment growth as the dependent variable may prove to be more insightful. Also, the econometric technique must eliminate biases and appreciate that each country is unique.

Economic theory gives some guidance on what to expect in terms of which of the key macroeconomic factors in this studied is likely to contribute to job creation. The economic literature is clear when it comes to economic growth and FDI. These are expected to have a direct and positive impact on the number of jobs being created within the economy. Although the literature also indicates that inflation, technological progress and productivity should have a positive and direct impact on job creation, the evidence is less conclusive. However, economic literature is inconclusive on the impact that minimum wage policies on job creation.

3. Research Methodology

This section outlines the testable predictions, followed by key variables used to answer the questions. The descriptive statistics highlights differences and similarities between countries. Followed by the empirical model and correlation analysis to identify potential multicollinearity.

The countries are divided into two groups to provide a system for comparison. Countries recognised as an Emerging Market (EMS) by the International Monetary Fund (IMF) or "BRICs + Next Eleven" based on the paper by O'Neill et al. (2005) belong to the EMS group. OECD consists of High Income OECD countries, not classified as an emerging economy (see appendix 1 country list of countries and their respective classifications).

3.1. Testable Predictions

Hypothesis 1: Real economic growth positively impacts Job Creation.

There is strong evidence suggesting economic growth has a positive effect on job creation. Based on the Okun relationship, growth negatively impacts unemployment. Hence it should be expected that economic growth has a positive effect on employment.

Hypothesis 2: Productivity positively impacts Job Creation.

Studies arguing against the positive effect of productivity gains on employment (Baily, Bartelsman, and Haltiwanger 1996) seem rather weak, due to their proxy for productivity. A more intuitive argument is that as worker productivity increases, the value of the marginal product of labour rises. i.e. the dollar value of an additional worker is larger, leading to firms employing more workers. Therefore, productivity gains should create jobs as reported by Davis and Haltiwanger (1990, 1991) and Mortensen and Pissarides (1994). We would expect the most productive countries, perhaps the OECD countries to have a stronger elasticity and therefore, obtain a larger benefit obtained from productivity gains.

Hypothesis 3: Technology negatively impacts Job Creation.

Recent studies provide evidence suggesting that technology not only complements labour but also opens up new markets and industries, which would otherwise have not been possible (Stewart et al., 2015). Aghion and Howitt (1994) assume that technology directly substitutes manual or monotonous jobs in non-tertiary industries. As a result, technological advances may greater impact predominately non-tertiary economies.

Hypothesis 4: Foreign Direct Investments positively impacts Job Creation.

FDI introduces new technology and investments, increasing aggregate demand, and should positively impact job creation (Karlsson et al., 2007). However, as Blonigen and Wang (2004) reported, inflows of FDI have a positive effect on developing, but not developed countries. As a result, we would expect FDI to have a greater positive impact on EMS countries, based on the assumption that OECD countries are better developed.

Hypothesis 5: Inflation positively impacts Job Creation.

Due to the widely accepted relationship observed by Phillips, (1958), we would expect inflation to have a positive effect on employment. The Phillips curve shows a decline in the unemployment rate as inflation levels increases. Therefore, we can expect

the employment rates to rise as inflation increases[5].

Hypothesis 6: Minimum Wages negatively impacts Job Creation.

Recent studies indicate minimum wages increase earnings without an adverse effect on employment (Dube et al., 2010; Linde Leonard et al., 2014). Their results contrast economic intuition as explained by the neo-classical model discussed in section 2.1 of the literature review. The majority of studies conclude that minimum wages have a definite negative impact on employment, given that minimum wages raises company labour cost (Carter, 1998).

3.2. Key Variables

Economic indicators and Population Census were obtained from the World Bank, employment data from the International Labour Organisation ("ILO"), and patents were from World International Property Organisation ("WIPO").

Job creation is the dependent variable and will be measured as the first difference in **employment rates.** The employment rate is a measure of the employed as a proportion of the labour force (ILO, 2016). As discussed in the literature review, using changes in the employment rate as a dependent variable is a better measure as it captures the relative difference as opposed to the absolute change, highlighting negative effects on employment.

Economic growth, measured by the annual percentage **growth rate of real GDP**, using 2005 as a base year (World Bank) will be the used to measure growth in the economy. GDP is arguably the best measure of economic performance because it directly measures the economic output. As a result, it is the most commonly used measure of growth in the economy.

GDP Per person employed at constant prices, base year 1990 will be the measure of **productivity** (World Bank). This has a similar intuition to the measure of productivity used by Baily et al. (1996), where they measure productivity as company gross output divided by the total number of workers. Alternatively, GDP per hours worked could have been used to measure productivity, but there was insufficient data available for the period being studied.

The percentage change in resident **patent per capita** in millions will be the measure of **technological progress**. (WIPO), a United Nations agency, aggregate patent applications filed through the Patent Corporation Treaty procedure or with national patent offices. WIPO defines a patent as "*an exclusive right granted for an invention, which is a product or a process that provides, in general, a new way of doing something, or offers a new technical solution to a problem*" (WIPO, 2014). Although technological progress is difficult to quantify, patents may be a better measure than the most commonly used measure of technology, Research and development (R&D). A reason for this is that highly efficient countries may be penalised when compared to very inefficient countries who spend large amounts on R&D, without much technological development. Therefore, there is sufficient justification for using patents as a proxy for technological advances, considering that patents are an objective measure of the technological progress achieved by the country.

Foreign Direct Investment is measured by net FDI inflows as a proportion of real GDP (World Bank). It includes equity transactions, earnings reinvestment, intercompany transactions and other forms of capital. Research suggests that foreign investments inflows create jobs as a result of company expansion. However, this may not be the case with OECD countries

[5] See appendices for the traditional Phillips curve and the adjusted Phillips curve.

as (Blonigen and Wang, 2004) reported the effects of FDI was insignificant for developed countries.

Inflation GDP deflator (annual %) (World Bank). This shows the general rate of price changes in the economy, rather than the change in wages, and may not yield the same results as Phillips (1958). Inflation is also lagged by a year as research suggests that the relationship between inflation and employment is not contemporaneous and takes between 6 to 18 months for the full effects to filter through the economy (Batini and Nelson, 2001).

Regressions including **minimum wages** (ILO) will have a sample period of 20 years between 1995 and 2014 as data prior to 1995 is unavailable. A dummy variable is used with the value of 1 if the country has a minimum wage in that year and 0 otherwise. From the literature review, the effects of minimum wages on employment are inconclusive. Some studies report minimum wages positively affect wages and employment (Dube et al., 2010), whereas others provide a strong evidence of a negative relationship between minimum wages and employment (Stigler, 1946; Carter, 1998; Leonard, 2000).

3.3. Descriptive Statistics

Although not all the variables listed in the table 1 have a bearing on job creation, they are useful in the interpretation of some of the findings in this paper.

Table 1. *Descriptive Statistics*

	High Income OECD ("OECD")			
Variable	Mean	Std. Dev.	Maximum	Minimum
Annual Gross Employment Growth (%)	0.93	2.51	27.64	-13.51
Employment (% of Labour Force)	92.54	4.11	99.60	72.50
Service Industry Employment (%)	65.48	8.57	85.70	27.90
Annual Growth Rate of Real GDP (%)	2.44	2.81	21.83	-14.72
Real GDP Per Capita	31,607.73	14,158.22	87,772.69	5,150.23
Annual Growth Rate of GDP Per Capita (%)	1.80	2.76	18.62	-14.56
GDP Per Person Employed - Productivity	38,462.70	10,232.96	70,149.00	14,032.00
FDI Net Inflows (% of GDP)	3.45	8.79	142.26	-58.98
Annual Inflation GDP Deflated (%)	5.79	18.49	390.68	-5.20
Patents Per Million Population - Technology	366.34	481.08	3,028.95	5.39
	Emerging Economies ("EMS")			
	Mean	Std. Dev.	Maximum	Minimum
Annual Gross Employment Growth (%)	2.64	13.21	184.26	-60.49
Employment (% of Labour Force)	92.29	4.79	99.40	71.50
Service Industry Employment (%)	48.15	15.77	78.60	9.20
Annual Growth Rate of Real GDP (%)	3.94	4.91	33.74	-22.93
Real GDP Per Capita	3,767.60	3,440.64	24,565.61	220.68
Annual Growth Rate of GDP Per Capita (%)	2.50	4.84	30.34	-24.46
GDP Per Person Employed - Productivity	13,695.52	8,147.77	47,723.00	1,655.00
FDI Net Inflows (% of GDP)	2.36	3.50	50.78	-16.09
Annual Inflation GDP Deflated (%)	59.80	326.95	6261.24	-8.64
Patents Per Million Population - Technology	88.88	343.34	3,253.87	0.03

Employment levels between both sets of countries are comparable. A greater proportion of people in OECD countries are employed in services (65.48%) compared with EMS countries (48.15%), which may be the reason for the significantly higher productivity and patents (technology) in the OECD countries. The standard deviation from the mean is also greater, suggesting there is greater disparity between countries. Mortensen and Pissarides (1994) assume that productivity gains increase demand for labour; therefore, productivity gains are expected to have a positive effect on job creation. As Solow (1957) concluded, a significant proportion of growth in developed countries is due to increases in productivity, rather than the physical accumulation of new capital. Thus, productivity is expected to have a greater impact on job creation in OECD countries than the developing countries.

There is a larger proportion of net FDI inflows in OECD countries compared to EMS countries, even though FDI in EMS countries grow at a faster rate (Neumayer, 2007). As noted by Blonigen and Wang (2004), FDI has a greater impact on less developed countries ("LDCs") than the developed countries ("DCs"). This may suggest that FDI may have a positive effect on job creation for EMS countries, but not for OECD countries.

Inflation rates are far greater in EMS countries than in OECD countries. Intuitively, this may contribute to higher employment levels in EMS countries, given that inflation and unemployment are theorised to have a negative relationship (Phillips, 1958). The maximum inflation rate for the EMS group is a significant outlier. Further analysis indicates that the high level of inflation in Peru during the 1990s was a result of poor governance by the Garcia administration, following the Latin America financial crisis (Edwards, 1995).

As a result of the descriptive statistics, we can see how the emerging economies 'earned their title'. Despite being significantly less developed (based on GDP per capita), they are growing at a considerable rate in terms of population, GDP output, FDI and employment. Furthermore, due to substantial differences between classifications, a model that accepts heterogeneity and individuality among countries is required.

3.4. Empirical Model

The model is a panel regression consisting of 56 countries between 1980 and 2014. Panel data is used because it is multidimensional and combines both time series and cross section regression models, which may be more accurate in observing the factors contributing to job creation of the countries over time. The economic approach develops the first difference variation of the Okun (1962) equation **(**1**)** and multiple homogeneous, and heterogeneous regressions are performed.

$$\Delta u = \beta_0 - \beta_1 (\Delta y),\ \beta_1<0 \tag{1}$$

$$(u_t - u_{t-1}) = \beta_0 - \beta_1 (y_t - y_{t-1}) + \varepsilon_{i,t},\ \beta_1<0 \tag{2}$$

$$Ł_t - E_t - (Ł_{t-1} - E_{t-1}) = \beta_0 + \beta_1 (y_t - y_{t-1}) + \varepsilon_{i,t},\ \beta_1>0 \tag{3}$$

$$E_t - E_{t-1} = \beta_0 + (Ł_t - Ł_{t-1}) + \beta_1 (y_t - y_{t-1}) + \varepsilon_{i,t},\ \beta_1>0 \tag{4}$$

$$E_t - E_{t-1} = \beta_0 + \beta_1 (y_t - y_{t-1}) + \varepsilon_{i,t},\ \beta_1>0 \tag{5}$$

Where u and E denotes the unemployment and employment rates respectively, Ł is the labour force participation rate, y is real GDP, β_0 is the intercept and ε is the disturbance term which captures other factors, such as usual changes in the labour force participation rate (Ball et al. 2013); thus Ł is omitted from equation (5). We have built on the Okun's equation (1) to model the impact of growth on employment, forming the framework, where we include other explanatory variables to help answer the research questions. The Okun coefficient (β_1) in equations (3), (4) and (5) are expected to be positive.

For the first model, we use a simple pooled Ordinary Least Squares (OLS), also known as the population averaged model. This estimator is homogeneous which assumes all countries are the same (Kosova, 2010).

$$\begin{aligned} ER_{i,t} - ER_{i,t-1} &= \beta_0 + \beta_1 GDP_{i,t} + \\ &+ \beta_2 PROD i,t + \beta_3 TECH i,t + \\ &+ \beta_4 FDI + \beta_5 INF_{i,t} + \varepsilon_{i,t} \end{aligned} \quad (6)$$

(ER) denotes the employment rate, GDP is the real GDP growth rate, PROD (productivity) is GDP per person employed, TECH (technology) is patents per million populations, FDI is Foreign Direct Investment as a proportion of GDP, INF is the inflation rate GDP deflated, i and t denote country i in year t, and ε is the error term.

Next, a dummy variable is used for the country classification, taking a value of 1 if the country is an emerging economies (EMS) and 0 otherwise. This is a similar method to the one used by Blonigen and Wang (2004) but it does not allow for individuality with each country.

$$\begin{aligned} ER_{i,t} - ER_{i,t-1} &= \beta_0 + \beta_1 GDP_{i,t} + \\ &+ \beta_2 PROD i,t + \beta_3 TECH i,t + \\ &+ \beta_4 FDI + \beta_5 INF_{i,t} + \\ &+ \beta_6 \delta CLASS_{i,t} + \varepsilon_{i,t} \end{aligned} \quad (1)$$

Although the random effect model does not deny heterogeneity or individuality that may exist amongst countries, it seems unsuitable because it assumes that regressors are uncorrelated with random error and the random effect (Kosova, 2010). This poses a problem because factors unique to countries not captured by the explanatory variables, such as culture, trade union power or employee protection, are likely to be correlated with the explanatory variables, and may impact the dependent variable, therefore, rendering the random effects estimation an inconsistent model (Neumayer, 2007).

In contrast, the fixed effects models allow for uniqueness and variations across countries and are preferred to the random effects model when observing cross-country relationships over time as it assigns each country an intercept value. Ball et al. (2015) note that lifetime employment is prevalent in Japan while temporary contracts are frequent in Spain. A fixed effects model will capture these unique factors.

The Hausman (1978) test is conducted to identify whether the fixed or random effect estimator is more appropriate. It is assumed that both models are consistent and that there is no correlation; therefore, the two estimates should not differ. However, if the fixed effect is consistent in reporting the β parameters without biases, then it is more suitable (Hsiao, 1985). As the results of the Hausman test are significant at 1%, the fixed effects model is more appropriate.

Lastly, for consistency, we test to see whether the Fixed effect or the pooled LSDV model is more appropriate by conducting the Wald test. We create a dummy variable for each country except one, as this country takes the value of β_0. The null hypothesis for the Wald test is; H0: $\beta_0=\delta_1=\delta_2...=\delta_{55}=0$; therefore, the LSDV model is more appropriate; otherwise, the

fixed effect model is more appropriate. The Wald test results are significant at the 1% confidence level, so we reject the null and use fixed effect estimator.

$$ER_{i,t} - ER_{i,t-1} = \beta_0 + \beta_1 GDP_{i,t} + \beta_2 PROD_{i,t} + \beta_3 TECH_{i,t} + \beta_4 FDI + \beta_5 INF_{i,t} + \delta_1 d1_{i,t} + \delta_2 d2_i + \delta_3 d3_i + \ldots + \delta_{55} d55_i + \varepsilon_{i,t} \quad (8)$$

δ_k denotes the coefficient of the dummy variable for all but one of the countries, which is represented by the intercept β_0. (See appendix for the full results of the Wald test)

$$ER_{i,t} - ER_{i,t-1} = \beta_0 + \beta_1 GDP_{i,t} + \beta_2 PROD_{i,t} + \beta_3 TECH_{i,t} + \beta_4 FDI + \beta_5 INF_{i,t} + \beta_6 \delta MW_{i,t} + \alpha_i + \varepsilon_{i,t} \quad (9)$$

Where α_i captures the unobserved heterogeneity (Wooldridge, 2003), which is the country specific (fixed) effects in this model. Equation (9) is the final fixed effects model, including the dummy variable (δMW) used to model the impact of the minimum wage (MW), with a value of 1 if there is a minimum wage and 0 otherwise.

3.5. Correlation Analysis

Table 2. *Correlation Matrix*

Correlation	D(ER)	GDP	PROD	TECH	FDI	INF	INF (-1)
D(ER)	1						
GDP	0.49	1					
PROD	0.02	-0.25	1				
TECH	-0.06	0.08	-0.09	1			
FDI	0.06	0.02	0.11	-0.01	1		
INF	-0.01	-0.07	-0.12	-0.01	-0.04	1	
INF(-1)	-0.01	-0.06	-0.13	-0.06	-0.05	0.63	1

Multicollinearity occurs when two or more independent variables are highly correlated with each other in a bivariate level analysis. A correlation coefficient greater than |0.7| (Wichers, 1975) poses a potential problem as there may be biases in the variance and standard errors, resulting with inaccuracies measure of the variable significance.

The correlations may provide an indication of what to expect from the results. We can see that the relationship between growth and employment is positive ($r = 0.49$), so the growth rate should have a positive effect on employment. We may also predict that productivity and FDI may have a positive impact, while technology and inflation may have a negative impact on employment. Current and previous year inflation will not both be in the same regressions; thus, there should not be an issue with multicollinearity in this study.

As we are unable to provide the p-values of the correlation coefficients, the correlations can only be used as a guide and caution must be placed when interpreting the results. However, multicollinearity can be detected if the results of the model showing a high R^2 value, despite having statically insignificant variables (Wichers, 1975).

Empirical Results

Table 3: *Dependent Variable – D(ER)*

Variable	All Countries						Emerging economies ("EMS")			OECD Countries ("OECD")		
	OLS	OLS	Random	Fixed	FE, Lag	FE, δMW	Fixed	FE, Lag	FE, δMW	Fixed	FE, Lag	FE, δMW
Coefficient (c)	-3.761*** (0.475)	-4.497*** (0.745)	-3.761*** (0.473)	-7.225*** (1.496)	-7.149*** (1.438)	-7.579*** (2.457)	-3.543* (1.898)	-3.526* (1.909)	-3.252 (2.830)	-15.17*** (2.253)	-14.82*** (2.280)	-31.70*** (5.403)
GDP	0.195*** (0.009)	0.194*** (0.009)	0.196*** (0.008)	0.222*** (0.009)	0.222*** (0.009)	0.221*** (0.011)	0.174*** (0.014)	0.174*** (0.014)	0.179*** (0.016)	0.295*** (0.012)	0.294*** (0.012)	0.284*** (0.015)
LOG(PROD)	0.303*** (0.046)	0.376*** (0.071)	0.304*** (0.046)	0.636*** (0.141)	0.633*** (0.142)	0.707*** (0.245)	0.291 (0.200)	0.290 (0.201)	0.309 (0.301)	1.357*** (0.213)	1.324*** (0.216)	2.944*** (0.511)
@PCY(TECH)	-0.004*** (0.001)	-0.005*** (0.001)	-0.005*** (0.001)	-0.004*** (0.001)	-0.004*** (0.001)	-0.002 (0.00)	-0.006*** (0.002)	-0.006*** (0.002)	-0.003 (0.003)	-0.002 (0.002)	-0.002 (0.002)	-0.002 (0.002)
FDI	0.006 (0.004)	0.005 (0.000)	0.000 (0.000)	0.007 (0.005)	0.007 (0.005)	0.007 (0.001)	0.013 (0.015)	0.012 (0.015)	0.004 (0.014)	0.006 (0.004)	0.006 (0.004)	0.008* (0.004)
INF	0.001* (0.000)	0.001* (0.000)	0.001** (0.000)	0.001* (0.000)	..	0.002 (0.001)	0.000 (0.000)	..	0.001 (0.001)	0.001 (0.002)	..	0.018 (0.020)
EMS Dummy	..	0.121 (0.094)	..	..	..	..	..	..	..	..	..	..
INF(-1)	..	..	..	..	0.001 (0.000)	..	..	0.000 (0.000)	..	..	0.000 (0.002)	..
MW Dummy	..	..	..	..	..	-0.424*** (0.153)	..	..	-0.467*** (0.277)	..	..	-0.627*** (0.187)
Observations	1413	1413	1413	1413	1410	981	603	602	442	810	808	539
Period (Years)	35	35	35	35	35	20	35	35	20	35	35	20
Adjusted R2	0.275	0.278	0.277	0.300	0.300	0.311	0.217	0.215	0.217	0.433	0.433	0.441
F-Statistic	107.927	90.294	107.927	11.108	11.049	8.356	6.212	6.146	4.814	20.310	20.244	13.882
Durbin-Watson	1.437	1.439	1.437	1.570	1.556	1.610	1.689	1.678	1.678	1.588	1.582	1.680
Hausman Test	..	..	67.790 (0.000)	..	..	..	..	..	..	..	..	..

Standard Errors in parenthesis.
Statistically significant at the 1%***, 5%** and 10%* confidence intervals.
Hausman test is asymptotically c2 distributed with p-values in brackets.
D(ER)is the first difference of the employment rate, GDP is the real GDP growth rate, LOG(PROD) is the log of GDP per person employed, @PCY(TECH) is percentage increase in patents per million population, FDI is Foreign Direct Investment as a proportion of GDP, INF is the annual rate of inflation, GDP deflated, EMS Dummy is the dummy variable for emerging economies, INF(-1) is INF lagged by a year, MW Dummy is the dummy variable for minimum wages.

4.1. Analysis and Discussion

Table 3 displays the empirical results, where, OLS, Random and Fixed denote the OLS, Random and Fixed Effects model respectively. FE, Lag is the fixed effects models with a 1-year inflation lag and δMW is the model with a dummy for minimum wages.

Hypothesis 1 predicted that real economic growth will have a **positive** effect on employment. Based on the results, we can confidently accept this hypothesis because the coefficients of economic growth are definite and significant across all models, for both sets of countries, suggesting they are robust. In the fixed effects model for all countries, the interpretation of the coefficient is that the first difference of the employment rate increases by 0.22%, as a result of a one percentage point increase in the GDP growth rate. The higher coefficient for OECD countries, 0.30 as opposed to 0.17 means that the effects of GDP growth on employment is more significant for OECD countries than emerging economies. This may be due to the fact that a 1% growth in OECD countries is greater than the same proportion for EMS countries in absolute values. It may also suggest that OECD countries have a greater multiplier effect, hence the larger impact of real growth on employment.

This result supports the findings by other studies in the field see Izyumov and Vahaly, (2002); Fidrmuc and Huang, (2015), where economic growth was evidenced to have an adverse impact on unemployment. Based on the results we may also conclude that economic growth remains one of the most significant, if not the most important determinant of job creation and that the Okun, (1962) relationship is not outdated and remains a fundamental macroeconomic principle.

Hypothesis 2 predicted that there will be a significant **positive** relationship between job creation and productivity gains. The results provide strong evidence of a positive relationship between productivity and job creation. In the fixed effects model for OECD countries, the interpretation is that a 1% increase in real GDP per person employed (productivity), leads to a 1.36 percentage point increase in the first difference of the employment rate. Although the results are inconclusive for EMS countries, the results were consistently significant in all OECD models. This indicates that the positive effects of productivity become materialized as the country develops.

The results are perhaps best explained by the Solow (1957) argument, where a significant proportion of growth in developed countries is due to increases in productivity, rather than the physical accumulation of new capital. Thus the positive and significant effect of productivity on employment for the OECD countries. As growth has a positive impact on job creation, it follows that growth induced by productivity will also have a positive influence on employment. The results also support studies by Davis and Haltiwanger (1990); Davis and Haltiwanger (1991); Mortensen and Pissarides (1994).

Hypothesis 3 predicted technology would have a **negative** impact on job creation. The results support this prediction for emerging economies but are inconclusive for OECD countries. For EMS and all countries, across all models excluding the models with minimum wages, the negative impact of technology is significant at the 1% confidence level. For OECD countries, we fail to accept the null that technology has any significance.

The results suggest that for less developed countries the substitution effect outweighs the complementary effects of technology. Aghion and Howitt (1994) advocate that technology directly substitutes manual or monotonous work, tending to be in the non-tertiary industry.

A practical example is that the introduction of new technology such as a combine harvester will require less human labour to carry on the exact same work as manually harvesting crops, leading to unemployment in the agriculture industry. Therefore, EMS countries that are predominately primary and secondary industry economies (see descriptive statistics), suffered a greater impact by the substitution effect induced by technology. Our results are unable to evidence a positive impact of technology, as suggested by (Stewart et al., 2015).

Hypothesis 4 predicted FDI would have a **positive** impact on job creation. Based on the results, the study is unable to accept this hypothesis because FDI was insignificant across all models. An explanation for this may be that the increase in employment opportunities as a result of foreign investments equalises job destruction as domestic firm exit the market due to being unable to compete with large multinationals. Thus, this results in FDI being insignificant.

Although as reported by Blonigen and Wang (2004), FDI was not expected to have a significant impact on the OECD countries, it should have been significant and positive for the emerging economies Karlsson et al. (2007). However, we accept the alternative and based on the results of this study, and conclude that FDI has no significant impact on the job creation. The results support similar research in the field, for instance, Kosova (2010) noted that the "crowding out" effects of FDI are short term and, there is no real long-term impact on employment. However, the results are in direct contrast with Mucuk and Demirsel (2013) as they reported FDI having an adverse effect on unemployment. This may be due to the different countries, time period and a much smaller sample size.

Hypothesis 5 predicted that Inflation was to have a **positive** impact on job creation. Based on the results, we are unable to accept the null as the results were not robust. Inflation is seen to be weakly significant at the 10% confidence level for the Pooled OLS and the initial fixed effects model for all countries, but was insignificant for all the other models. Due to the results of the Wald and Hausman (1978) tests, the fixed effects estimators are more appropriate for our model as the pooled OLS and random estimators, may be reporting biases. Therefore, due to possible inaccuracies with the pooled OLS and random effects estimators, we reject the null and accept the alternative.

Remarkably, this result is in contrast to the supposed relationship between inflation and employment proposed by Phillips (1958). Even when we lagged inflation by a year to capture the full effects, (Batini and Nelson, 2001), it remains insignificant. An explanation for this is that inflation may not have a long run impact because, in the long run, unemployment will be at the natural rate of unemployment (Friedman, 1968) or that the effects of inflation on employment levels are insignificant in modern economies (Brian, 2006). Perhaps if inflation had been measured as the change in wages, used by Phillips (1958), we might have replicated similar results.

Hypothesis 6 predicted that there is a significant and **negative** impact of minimum wages on job creation. Based on the results, we can accept this hypothesis because the negative effects of minimum wages were definite and significant across all models and for both sets of countries, suggesting they are robust. It may be that in a competitive market, firms are less willing to employ workers if they have to pay a minimum wage because it raises the cost of labour, relative to other inputs. The results are in line with findings in the studies by Stigler (1946), Carter (1998) and Leonard, (2000). It also confirms that the neo-classical

theory regarding minimum wages remains relevant in modern economics.

4.2. Evaluation of the Model

With sufficient observations to be confident in the results, the fixed effects model seems to be consistent. Additionally, the results of the F-statistic, which measures the relevance of the independent variables to the models, is significant at the 99% confidence interval. Therefore, the null is rejected and we can conclude that models are significant.

The Durbin-Watson statistic shows the degree of autocorrelation in the model. A value of 0 indicates positive autocorrelation while 4 shows negative autocorrelation. A value of 2 indicates that there is no autocorrelation. The statistics is lower in the pooled OLS model, which indicates slightly negative autocorrelation in the errors. However, the models using the fixed effects seem to have less of an issue regarding autocorrelation.

The adjusted R^2 is a variation of the R^2, which measures the goodness of fit of the predicted model. The adjusted R^2 for our models is reasonable, justifying their inclusion in the regressions. The adjusted R^2 is higher in the OECD models than the models for emerging economies, suggesting the independent variables explains more of the deviation in job creation for OECD countries.

Comparing the simple OLS, Fixed and Random effects models, we can see that the fixed effect model offers the better results. It has a higher adjusted R^2 value and a much lower F-Statistic, and based on the Wald and Hausman (1978) tests, is more consistent in reporting the β values.

5. Concluding Remarks and Policy Implications

This study has investigated the impact of key determinants of job creation, namely Real Economic Growth, Productivity, Technological Progress, Foreign Direct Investment, Inflation and Minimum Wages, across OECD countries and emerging economies.

Based on the results of this study, there is substantial evidence suggesting economic growth and productivity have a significantly positive impact on job creation. The negative effect of minimum wages on job creation was found to be definite and significant across all models and for both developed and emerging economies. Countries experiencing high growth rates and considerable productivity gains will create substantial jobs in the process.

The extent to which productivity and technology impacts job creation depends on the development of the country. Technology was evidenced to substitute labour in emerging economies, thus destroying jobs but was inconclusive for developed countries. This could have significant policy implications for developing economies. The results indicate that substantial investment in technology in developing economies will destroy jobs. Government of emerging economies may seek other arrangements to boost jobs (such as economic growth or productivity gains), to avoid the substitution of labour within these economies.

However, FDI was found to have no noticeable effect on job creation, disproving economic intuition as foreign investment inflows ought to create employment opportunities in the target economy. The effects of inflation were also largely inconclusive, and this study was unable to replicate the existence of the Phillips curve. A significant policy implication is that inflation targeting by central banks may be outdated and ineffective in stimulating employment levels within the economy.

Further implications of this paper are that policies promoting growth and productivity are likely to create sustainable employment opportunities, while the introduction of

minimum wages, although protecting the lowest earners in the economy should be avoided, strictly from a job creation perspective. This means the introduction of minimum wages in Germany and the United Kingdom's recent increase are not effective economic policies to protecting the lower paid and most vulnerable in our society and may negatively impact employment.

Furthermore, countries such as Brazil, Russia, India, China and South Africa ("BRICS") who currently have amongst the fastest economic growth rates on the planet (World Bank, 2015) are expected to create a significant amount of jobs in the near future. This development should see them become highly influential and important on a global scale.

The results indicate that the rapid technological advances in the emerging economies may lead to direct substitution of labour. The situation is not expected to improve in the future, as the ILO study discussed in the contextual background forecasts unemployment to increase for emerging economies as technology progresses (ILO, 2016).

The quicker a country experiences structural change, shifting jobs from agriculture and manufacturing to becoming a predominately tertiary economy, less significant will the negative impact of technology become and the likelier that the positive impact of productivity gains be realised. This may lead to higher employment rates, faster growth and development, where China is a model example[6].

Kane (2020) identified that startups create 3 million jobs annually. This finding is perhaps more pertinent for developing economies, whereby if these government encourage entrepreneurship and a greater investment is startups and other young entrepreneurial endeavours, it could result with a significant increase in the numbers of jobs being created within that economy. This finding is supported by Thurik, and Wennekers (2004), who also reached a similar conclusion. They assert that entrepreneurship is a key driver for economic growth and job creation. Within the emerging economies, this could alleviate poverty and expedite their development. However, detailed policy implications of investment in young businesses is beyond the scope of this paper.

5.1. Limitations and Further Research

Limitations beyond the scope of this study are highlighted and may motivate further research. Firstly, taking into account the actual minimum wage, rather than a dummy variable, or distinguishing between the relative minimum wage and the proportion of average wages in the economy may provide different results or possibly offer a greater insight of the impact of minimum wages on the economy.

This study opted to use the Inflation GDP deflator as a proxy for measuring inflation. This measure shows the general rate of price changes in the economy rather than the change in wages. If inflation was measured by change in wages, a more accurate measure of wage inflation, we may have replicated similar results to Phillips (1958). This is due to the fact it quantifies the direct effect of inflation on the labour market, (instead of the wider economy) which may have yielded results that are more consistent.

Additionally, research and development (R&D) as a proxy for technological progress may yield different results to what was evidenced in this study, which used patent per capita. Patent per capita is likely to skew the results and favour more developed economies that have formal patent application

[6] See appendix for a brief China case study.

processes. This means that technological progress is likely to be biased towards the developed economies, and its impact is likely to be overstated, while the same measure will be understated for the developing economies. A lack of sufficient and consistent data was the reason for using patent per capita as a proxy for technology.

This study was ambitious in in nature, presenting a comprehensive analysis in modelling the impact of key economic variables on job creation. Researchers may wish focus further research on just some of the key variables, which could yield more depth on these variables.

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7. Appendices

7.1. Appendix 1: Country Classifications

Countries recognised as an Emerging Market (EMS) either by the International Monetary Fund (IMF) or "BRICs + Next Eleven" based on the paper by O'Neill et al. (2005) belong to the EMS group, while OECD countries (OECD) consist of High Income OECD countries and are not classified as an emerging economy.

High Income OECD Countries (OECD)
Australia, Austria, Belgium, Canada, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Iceland, Ireland, Israel, Italy, Japan, Luxembourg, Netherlands, New Zealand, Norway, Portugal, Slovak Republic, Slovenia, Spain, Sweden, Switzerland, United Kingdom, United States.
Emerging Economies (EMS)
Argentina, Bangladesh, Brazil, Bulgaria, Chile, China, Colombia, Egypt, Hungary, India, Indonesia, Iran, Korea Republic, Malaysia, Mexico, Nigeria, Pakistan, Peru, Philippines, Poland, Romania, Russian Federation, South Africa, Thailand, Turkey, Ukraine, Venezuela, Vietnam.

7.2. Appendix 2: Inverse Okun Relationship

Figure 4 shows a positive relationship between employment, growth and output for all countries, suggesting growth may be a significant determinant of employment. This confirms the observation by Palát, (2013) and Ball et al., (2015) as to why forecasters are still heavily reliant on Okun's law. Figure 5 reveals the same trends for the OECD countries and the EMS countries.

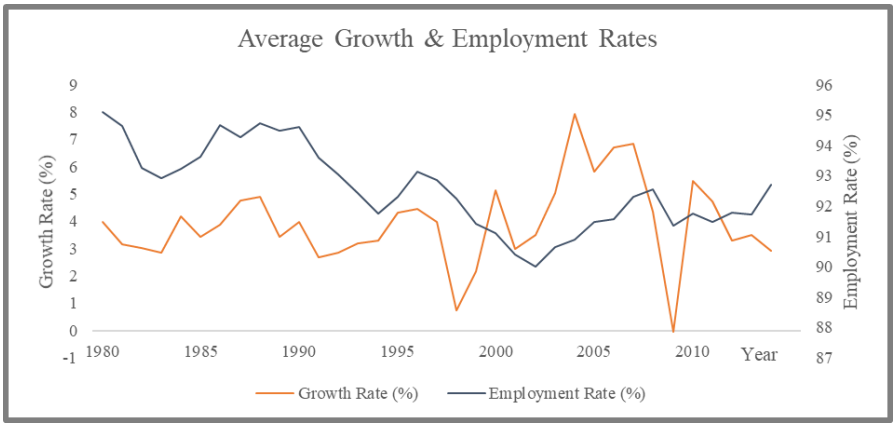

Figure 4[7]

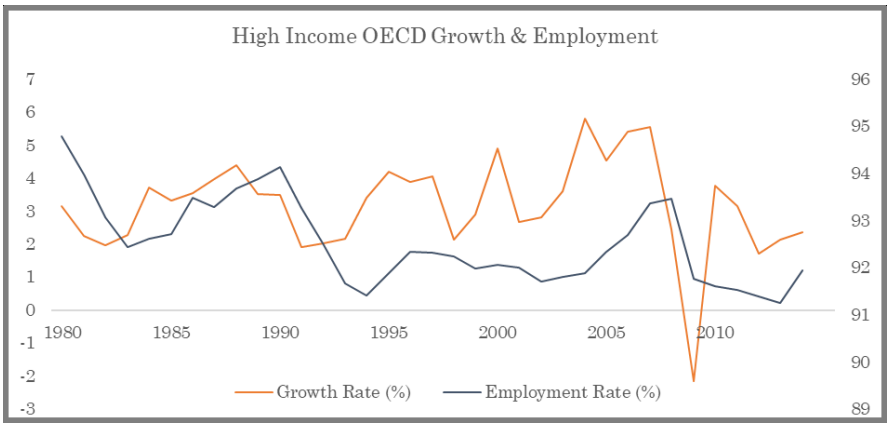

Figure 5

Figure 6

[7] Real growth rates obtained from the (World Bank, 2016), while Employment data was gathered from the International Labour Organisation (ILO, 2016

7.3. Appendix 3: Phillips Curves

Figure 7 shows the negative relationship and the expected positive relationship between inflation and employment. NAIRU is at the intersection between π* and u*. Based on this relationship, the Phillips curve was adjusted to show a possible positive relationship with job creation. Some models reported inflation was positive and significant, but was inconsistent and lacked robustness when using the fixed effects model.

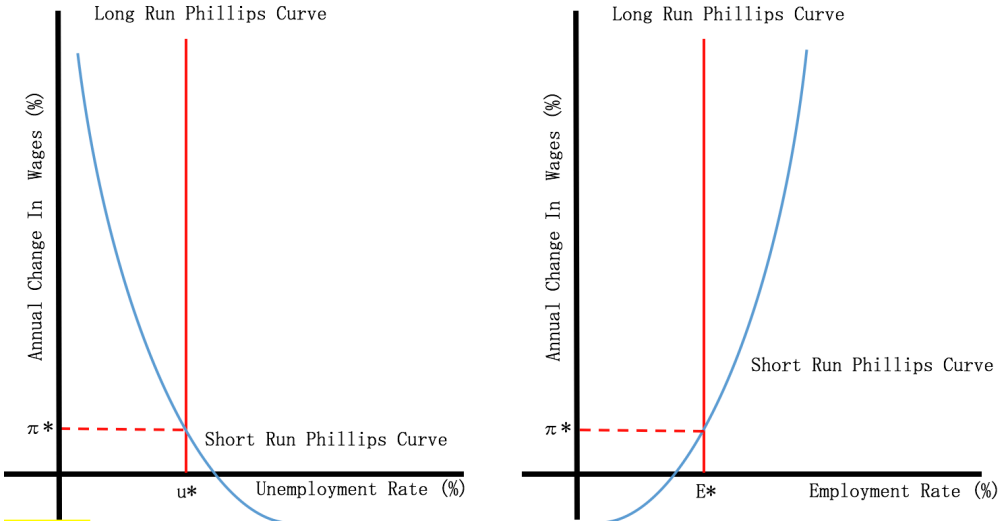

Figure 7

7.4. Appendix4: LSDV Test Results

Argentina was the base country and has been assigned the value of the intercept. The country coefficients all relate to the coefficient for Argentina.

Table 4

Country	Coefficient	Std. Error	Country	Coefficient	Std. Error
Argentina	-7.262***	1.432	Korea, Rep.	-0.543**	0.274
Australia	-0.287	0.313	Luxembourg	-0.782*	0.398
Austria	-0.045	0.283	Malaysia	-0.09	0.298
Bangladesh	1.834**	0.859	Mexico	0.429	0.32
Belgium	-0.261	0.382	Netherlands	0.035	0.305
Brazil	0.48	0.308	New Zealand	-0.038	0.276
Bulgaria	0.34	0.308	Nigeria	-1.733**	0.81
Canada	-0.057	0.285	Norway	-0.149	0.285
Chile	-0.081	0.272	Pakistan	0.553	0.352
China	-0.403	0.351	Peru	0.022	0.332
Colombia	0.489*	0.288	Philippines	0.757**	0.319

Country	Coefficient	Std. Error	Country	Coefficient	Std. Error
Czech Republic	0.224	0.31	Poland	0.119	0.302
Denmark	0.143	0.283	Portugal	0.206	0.272
Egypt, Arab Rep.	-0.268	0.307	Romania	0.855**	0.342
Estonia	-0.306	0.326	Russian Federation	0.683**	0.312
Finland	-0.04	0.282	Slovak Republic	-0.196	0.315
France	-0.087	0.289	Slovenia	-0.048	0.323
Germany	0.213	0.308	South Africa	0.277	0.356
Greece	-0.128	0.28	Spain	-0.368	0.278
Hungary	0.575*	0.307	Sweden	-0.123	0.282
Iceland	-0.157	0.28	Switzerland	0.023	0.312
India	-0.089	0.522	Thailand	-0.368	0.292
Indonesia	0.558	0.349	Turkey	-0.017	0.289
Iran, Islamic Rep.	0.539	0.413	Ukraine	0.894**	0.354
Ireland	-0.607**	0.289	United Kingdom	0.225	0.282
Israel	-0.574**	0.279	United States	-0.017	0.297
Italy	0.277	0.33	Venezuela, RB	0.894*	0.354
Japan	0.108	0.286	Vietnam	-0.025	0.418
Statistically significant at the 1%***, 5%** and 10%* confidence intervals.					