
The Impact of Entrepreneurship on Economic Growth and Development in the UK

Talal Farouq
Northumbria University in London
talal.farouq@northumbria.ac.uk

Dr Sumesh Dadwal
Northumbria University in London
dadwal.ss@googlemail.com

Abstract

The role of entrepreneurship in economic growth has received minimal attention in research compared to other factors mainly because of the challenges involved in measuring entrepreneurship to make it an appropriate variable. Despite the enhanced understanding of the multiple elements of economic growth, economics literature and models fall short of addressing the influence of entrepreneurs on economic growth. The amassing of factors such as knowledge, human, and physical capital do not comprehensively explain economic advancement. This report sought to assess the impact of entrepreneurship on economic growth in the UK by a building a regression model. It used the annual change in GDP per capita as a measure of economic development and the dependent variable of the model. The independent variables of the study were the unemployment rate, self-employment, and a number of start-ups. The analysis established that the rate of unemployment was the most significant variable of the research and it adversely affects the economic growth. The estimated model did not adequately impact the movement of the economy. Also, the self-employment coefficient was not significant for the study. Therefore, the study established that entrepreneurship does not significantly affect economic growth.

Keywords: Entrepreneurship, economic growth, GDP, Employment

Introduction

Economic growth is a function of multiple factors which include climate, savings propensity, level of education, technological development, infrastructure, and government policies. According to Bleaney and Nishayama (2002), the literature on the subject of economic growth suggests that both economic variables and non-economic variables have a significant influence on economic growth. Despite the enhanced understanding of the multiple elements of economic growth, economics literature and models fall short of addressing the influence of entrepreneurs on economic growth. According to Friis, Karlsson, and Paulsson (2006), the entrepreneur is an elusive character in the economic theory owing to challenges of a precise description. It is difficult to give a single definition of entrepreneurship since multiple theoretical approaches yield to operational difficulties. Theoretical approaches are incomplete as they only address parts of the whole concept (Friis et al., 2006).

For the past two decades, there has been minimal attention to the role of entrepreneurship on a macroeconomics' scale. Studies such as Audtretsch (1995), Caves (1998), and Sutton (1997) assess the impact of entrepreneurship on firm size, company growth, and survival but fail to determine the effect of entrepreneurship on a macroeconomic scale.

According to Braunerhjelm (2010), economic growth is attributable to the following essential factors: an increase in factors of production, improved efficiency in the allocation of resources, knowledge and the degree of innovation. Entrepreneurship is likely to impact economic growth through various innovations that introduce new products and services to the market.

Despite the overwhelming support of the need for entrepreneurship in various economies, there has been minimum effort to link economic growth to entrepreneurship at a national level (Reynolds, Wennekers & Thurik, 2005). It is mainly attributable to the paucity of theoretical frameworks connecting economic growth to entrepreneurship with explanations of economic growth generally limited to the realm of elements of macroeconomics (Krugman, 1991). The objective of this paper is to evaluate the role of entrepreneurship in economic growth in the UK. It will involve reviewing various previous studies on the subject and conduct an analysis using quantitative data to determine the effect of entrepreneurship on the growth of the economy.

Problem Statement

Although multiple studies have been conducted to assess how the economy responds to changes in various microeconomic elements, entrepreneurship has not extensively been examined as a factor that leads to economic growth despite the universal consensus that entrepreneurs play a vital

role in the economy. This paper seeks to evaluate the impact of entrepreneurship on economic growth and development in the UK.

To address the primary objective of the study this report will address the following questions to enhance the quality of the research:

- a. What factors influence entrepreneurship?
- b. What is the level of entrepreneurship in the UK?
- c. What factors impact economic development in the UK?

The study will provide insight into the relationship between entrepreneurship and economic growth. It will re-examine the fundamentals of economic growth and provide a relatively new perspective on how entrepreneurship plays a role in the same. It will evaluate the degree to which the UK's entrepreneurs play a role on a macroeconomic scale. As a result, the report will guide future policies geared towards economic expansion.

Literature Review

Entrepreneurship comprises of a mix of straightforward economic explanations, attributes that describe an entrepreneur, cultural factors and path-dependency (Braunerhjelm, 2010). It is a global phenomenon that lacks a single agreed-upon description, as scholars have suggested multiple definitions. Knight (1921) defined entrepreneurship as the uncertainty involved in making a distinction between calculated risk and uncalculated risk. It is the process of discovering and the acting upon previously unnoticed and often opportunities with marginal profits (Kirzner, 1973). Casson (1982) suggests that entrepreneurs specialize in making complex decisions involving the allocation of resources. According to Hebert and Link (1989), an entrepreneur is an individual who is responsible for and makes decisions about the location, form, and the use of resources. Baumol (1993) described an entrepreneur as someone who is ingenious and creative in establishing ways that add to their wealth, power, and prestige. Vosloo (1994) describes an entrepreneur as "a person who can explore the environment, identify opportunities for improvement, mobilize resources and implement action to maximize those opportunities" (p. 147). Yu (1997) contends that Schumpeter's entrepreneur prevents the economy from achieving an equilibrium whereas Kirzner's entrepreneur brings the economy to equilibrium by identifying and profiting from disequilibria.

Entrepreneurs not only seek out and identify potentially profitable economic opportunities but are also willing to take risks to see if their hunches are right (OECD, 1998, p.11). Wenekers and Thurik (1999) describe entrepreneurship as the ability and willingness of an individual or group of individuals within and outside a given organization to perceive and create new economic

opportunities and to introduce them in the market despite the uncertainty and challenges involved. Table 1 below shows the various types of entrepreneurs as suggested by Wennekers and Thurik (1999) with four classifications based on the nature of employment and role of the entrepreneur.

Table 1: Types of Entrepreneurs

	Self-employed	Employee
Entrepreneurial	Schumpeterian entrepreneurs	Intrapreneurs
Managerial	Managerial business owners	Executive managers

(Source: Wennekers and Thurik, 1999, p. 47)

Schumpeterian entrepreneurs own, and direct independent small firms that are innovative and disruptive and they tend to develop into managerial business owners. Intrapreneurs, on the other hand, refer to the class of entrepreneurs who take commercial initiatives on behalf of their employer risking their reputation and employment in the process. Managerial business owners include entrepreneurs such as shopkeepers, franchisees and individuals offering professional services.

Factors Affecting Entrepreneurship

At the macroeconomic level, the most commonly defined determinants of entrepreneurship include the rate of (un)employment, economic growth, investments, inflation, interest rates, and availability of infrastructure (Wang, 2006). Reynolds and Lancaster (2006) observe that factors like government spending on health, infrastructure, and education are positively correlated with the number of start-ups recorded. Tur-Porcar, Roig-Tierno and Mestre (2018) undertook a study to establish which economic, environmental, business, behavioral factors, and human relations factors had the most significant effect on entrepreneurship.

Factors that enhance entrepreneurial activities can be broadly classified as push or pull factors. Push factors are associated with difficult working conditions, low family income, job dissatisfaction, job loss, unemployment, and economic recession. Pull factors, on the other hand, are related to the need for independence and self-actualization, wealth creation, and elevation of social status and power (Vossenber, 2013). In some instances both push and pull factors play a role in enhancing the entrepreneurial activity. Klapper and Parker (2011) established that unemployment is as the most common reason for entrepreneurship.

Kobessi (2010) observed that social-cultural factors motivated people to create new enterprises. Noguera et al. (2013) established that the most significant social factors include the fear of failure,

role models, and the perceived capabilities and opportunities. Baron (2007) observed that entrepreneurs with well-developed social skills could access higher and broader social networks.

Moore's model (1986) argues that there are always underlying factors that trigger an entrepreneurial undertaking such as personal attributes, environmental factors, and other sociological factors. Bygrave and Zacharakis (2004) observe that entrepreneurs actively pursue independence when starting out businesses.

Measuring Entrepreneurship

According to Braunerhjelm (2010), entrepreneurship does not primarily entail starting a new venture but a set of abilities embodied within an individual. Numerous studies on entrepreneurship rely on self-employment data due to the availability of the same across various countries and regions. However, Earle and Sakova (2000) and Blanchlower (2000) observe that self-employment is an extremely heterogeneous data set which could easily represent the employment push factors. Some of the alternative measures put forward in previous studies include the number of establishment (Beck and Levine, 2001), business ownership (Carre, Van Stel & Thurik, 2002) or density of firms (Klapper, Amit & Guillen, 2008). Dejrdin and Fritsch (2011) proposed the use of the net birth rate as an indicator of entrepreneurship, in addition to outlining industrial structural shifts.

Economic Growth

Economic growth is the rise in an economy's capacity to produce goods and services over a given period. Increased GDP symbolizes increased productivity. As a result, more employment opportunities are created (Cecchetti & Kharroubi, 2015). Determination of economic growth was initially proposed by Malthus (Hogson, 2016), who brought forward the classical model of economic growth. According to the classical model, increasing one of the factors of production while holding the other factors constant results in positive economic growth.

The Solow-Swan model, developed in the early 1950s by Trevor Swan and Robert Solow, predicts that factors of production experience diminishing returns over an extended period (Leimbach et al., 2017). The Solow-Swan model has faced criticism from endogenous theorists such as Becker et al. (1990) who proposed that Solow and Swan (1950) focused more on exogenous variables (such as capital, labour, and GDP) in explaining economic growth. For instance, Becker et al. (1990) point out the increasing importance of human capital to economic growth.

Factors affecting Economic Growth

Natural resources such as minerals and water are sometimes harvested and processed or used in the manufacturing sector to produce finished goods. Some natural resources such as land and wildlife are mainly used as platforms on which production occurs (Bergstrom & Randall, 2016). Sometimes, regulations developed by national governments might hinder particular economic activities hence slowing down economic growth. In this scope, the political environment is conceptualized as the governing as well as oversight parties (Becker et al., 1990). For instance, too much imposition of taxes on foreign companies by the Chinese government has resulted in very few Western companies successfully establishing their brands in the country (Alesina et al., 1996).

Human capital is the aggregate level of skill and competence that a country's productive population has. Akcigit (2017) defines human capital as the skills and competencies that individuals should possess to execute particular tasks deemed beneficial to the society and themselves. Economists have used the human capital concept in both endogenous and classical economic growth models such as the Becker et al. (1990). The essence of technological advancement in economic growth has also been emphasized by Al-Moulani and Alexiou (2017), who points out that innovation contributes significantly to economic growth.

Measuring Economic Growth

Economic scholars have developed various approaches for measurement of economic growth. The most widely used measure is the Gross Domestic Product (GDP). Fraumeni et al. (2017) identify three approaches commonly used in the calculation of GDP; the expenditures approach, the income approach, and the value-added approach. According to Coyle (2014). Mahravan and Vale (2017) contend that GDP does not reflect a genuine measure of economic development because it includes all services and goods without considering the net benefit produced by the final value of goods and services. Costanza et al. (2009) also flagged GDP as a misinterpreted concept often distorted as a depiction of a country's economic growth. The Genuine Progress Indicator (GPI) was developed to replace GDP. Precisely, GPI takes into account the social and environmental aspects of development. In this case, the cost of individual consumption expenditure is used. Variables such as poverty index greatly determine GPI; an increase in relative poverty should result in a corresponding reduction in GPI.

Theories of Entrepreneurship and Economic Growth

Steele (2000) criticised the traditional theoretical approaches to economic growth and divided the existing account into two categories, institutional or historical accounts, and mathematical macroeconomic models, and questioning the underlying neoclassical assumptions of individual

optimization and social equilibrium. Wennekers and Thurik (1999) offered an alternative system where they attributed economic growth through entrepreneurship to enhanced competition, innovation and job-growth as a result of firm start-ups.

The various schools of thoughts on entrepreneurship are centered on the multiple factors as illustrated in table 2 below.

Table 2: Assessment of an Entrepreneurs Role as Drawn From Various Fields of Research.

Field of literature	Specific domain	Competition	Innovation	Firm start-ups	Importance of entrepreneurship for economic growth
Historical views	Schumpeter / Baumol	++	+++	+	++
	Neo-classicals	++	+	0	+
	Austrians	++	+	0	++
Endogenous growth theory		+	+++	0	+
Economic history		++	+++	+	+++
Management literature		+	+++	++	++
Industrial economics	Porter	+++	+++	++	+++
Evolutionary economics	Eliasson	+++	+++	+++	+++
0 Not present in the writings. + Implicitly present in the writings. ++ Explicitly present in the writings. +++ Pivotal element in the writings.					

(Source: Wennekers and Thurik, 1999, p.50)

Schumpeter (1934) and Baumol (1968) describe the entrepreneur as an innovator and inspirer, instrumental in the creative destruction or creative instability, economic development, and disequilibrium. According to Yu (1997), Schumpeter’s perspective was based on the use of equilibrium models and static analysis under the assumptions of rational behaviour and profit

maximisation. Related to Chicago school of thoughts, Glancey and McQuaid (2000) observed that the neoclassical assumptions also referred to as Chicago tradition has limitations imposed on it entrepreneurship by perfect information, perfect competition, and rational behaviour (Knight, 1921). On the other hand, the defining characteristic of the Austrian entrepreneur is the ability to perceive profit opportunities (Braunerhjelm, 2010). Kirzner (1973) put forward that the link between entrepreneurship and economic growth is based on the entrepreneur's ability to spot and profit from a given disequilibrium by improving on the markets deficiencies and inefficiencies. The insights of entrepreneurs tend to result in the creation of opportunities as it creates changes, and changes create more opportunities (Holcombe, 1998).

Further, there are numerous neoclassical growth models. However, no single growth model has received as much attention as the Solow (1956) growth model which says that the accumulation of capital is not sufficient to account for the historical growth of per capita income or to explain the global differences in per capita output.

Technologies and knowledge are likely to vary and have different origin such as scientific research, learning by doing, and private research and development and innovation. However, the entrepreneur is not vital to the endogenous growth models (Lucas, 1988). The model achieves an equilibrium with a given level of innovation which is constant in the steady state (Braunerhjelm, 2010).

Institutional Frameworks and Economics

According to North and Thomas (1973) elements such as innovation, education, economies of scale, and capital accumulation are not just causes of growth but growth, and as a result, growth will only occur with the existence of efficient economic institutions since individuals must be lured by incentives to undertake certain ventures. North (1990) infers that an entrepreneur is an agent of change responding to the stimuli emanating from the institutional framework.

Industrial Economics

Porter (1990) established various significant determinants of economic growth such as demand conditions, a strategy used by the firm, rivalry, government policies, related and supporting industries. Hence, competitive advantage is a function of the various determinants. Wennekers et al. (1997) advocate the use of the model to analyse the relationship between entrepreneurship and economic growth.

Evolutionary Economics

The theory of evolutionary economics is anchored on the notion of bounded rationality where all individuals are different and face uncertainties about the possible courses of action and the consequences thereof (Nelson & Winter, 1982). According to Eliasson (1994), competence is an

essential element for the survival of a given entity where competence is the ability to use globally available technology to profit locally. The problem-solving process is characterised by trial-and-error as a single problem is likely to have more than one solution. Eliasson and Braunerhjelm (1998) advocate that economic growth results from building competencies.

Recombinant Growth

The idea of recombinant growth is based on Schumpeter's notion of innovation due to new combinations. Olsson and Frey (2002) developed the model by including the process of combining ideas that take place in a multidimensional technological space where ideas are distinguished by technological distance.

Innovation and Economic Growth

Rothwel and Zegveld (1982) analysed 380 innovations made in the UK, US, Japan, and France between 1953 and 1973. They established that small firms were accountable for 31% of all innovations while large firms contributed 54%. Acs and Audretsch (2001) observe that there are substantial differences in the significance of innovation by small firms across various sectors. Baldwin and Johnson (1999) mentioned the significance of small enterprises in innovation in the electronic, biotechnology, medical equipment, and instruments sectors. Garoski (1995) observed that market concentration and innovation have a strong negative correlation. Baldwin (1995) in a study of small and medium-sized enterprises (SMEs) in Canada between 1984 and 1988 observed that more successful firms tend to focus more on innovation than their less successful counterparts. Almeida and Phene (2004) observed that small firms tend to venture more into unexplored fields of technology than large corporations which concentrate on more established fields.

Competition and Economic Growth

Geroski (1995) stated that "competition plays a significant role in stimulating productivity, with both new firms and new ideas provoking movements to, and outwards movement of, the production frontier which the data suggest, would not have occurred in their absence" (p. 88). Nickell (1996) in a UK based study of multiple firms established that there was weak evidence to support the hypothesis that competition yields to high corporate performance. A study by Gort and Sung (1999) on the US telephone industry observed that increased competition has significantly contributed to greater efficiency in the sector.

Start-ups and Economic Growth

Vosloo (1994) observed that start-ups have unique qualities that enable them to accelerate economic growth at a higher rate than established firms. Audretsch et al. (2000) analysed 18 European countries to evaluate the extent to which decentralization of an industry structure influences economic growth. The result of the study suggested that quicker decentralisation spurs

more economic growth. In an earlier study, Wengenroth (1999) inferred that small businesses were the catalyst of industrial growth as they provided the background of skills and services which facilitated the mass consumption of industrial products. Audretsch et al. (2001) using data from 23 OECD countries from 1974 to 1998 studied the relationship between entrepreneurship and unemployment. They established that entrepreneurship as firm start-up has both a positive effect and negative effect on unemployment depending on the entrepreneurial theory used. Folster (2002) in an analysis of employment in Sweden establishes that an increase in self-employment has a significant positive effect on the overall employment rate. In another study in Sweden, Lundstrom et al. (1993) established that the small business sector created 70% of the new net jobs in the period from 1985 to 1989.

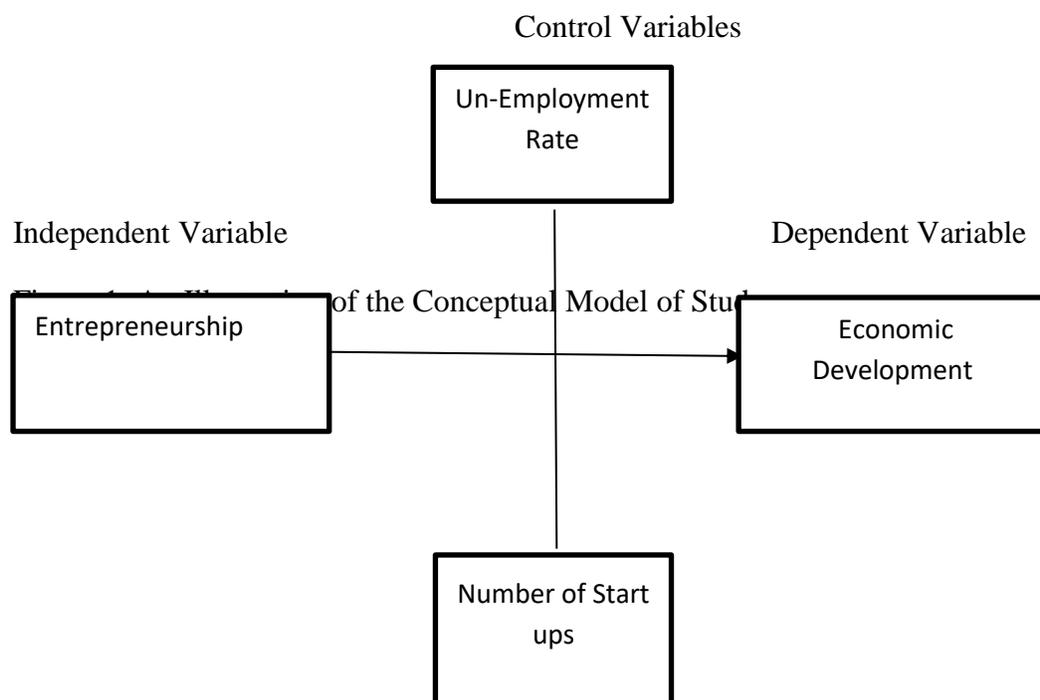
Carree and Thurik (1997) carried out a study to assess the market conditions favouring small or large firms. They established that economies of scale stimulate the large firms, and decreased average costs with increased experience. Blanchflower (2000) in a study comparing the level of self-employment across 23 OECD countries established that the level of non-agriculture self-employment had decreased in most countries. Heshmati (2001) tested the growth of small firms by calculating five various asset growth model parameter estimates of a large sample of firms where he established that the relationship between growth, size, and age of firms is highly specific to the estimation method as well as the function of size and growth. Haltiwanger and Krizan (1999) using data from the US manufacturing sector established that young firms exhibit high average net employment growth rate and volatility compared to large established entities.

Research Methodology

Research philosophy is concerned about views of how the world works, reality, existence, and knowledge (Sauders & Lewis, 2009). In this study, a positivist approach is used. It emphasizes the use of deductive theorizing, generates several propositions for objective testing and empirical verification and minimizes the interaction of the researcher with study subjects to reduce the likelihood of bias (Sauders & Lewis, 2009). The research is based on a research-question driven approach where the research questions and specific variables were determined before the data was collected. The specific variables were GDP per capita, self-employment, the number of start-ups and the rate of unemployment. This report relies on secondary data which is retrieved from various sources. The dependent variable for this study was an economic development which was used as a measure of economic growth. The independent variables were the rate of self-employment, number of start-ups, and the rate of unemployment, which was being used to evaluate the entrepreneurship factor in the UK. It used yearly data from 2000 to 2016 to establish the relationship between entrepreneurship and economic growth. The GDP per capita data were obtained from the Office for National Statistics (GB), while the data on self-employment rate was

obtained from OECD and Labour Force Survey (LFS). The number of start-ups data were obtained from STARTUP BRITAIN (<http://startupbritain.org/startup-tracker/>). The rate of unemployment data was obtained from the Office for National Statistics (GB). The population is about 4,000 entrepreneurs.

Regression analysis was used to model the relationship between the variables to determine the association between entrepreneurship and economic growth. It was also used to create the regression model required to evaluate the relationship between entrepreneurship and economic growth. The conceptual model of the study is as shown in figure 1 below. The control variables for the study are the un-employment rate and the number of start-ups. The study focuses on evaluating how entrepreneurship affects economic development as illustrated in figure 1 below.



The general regression model of the study is as follows:

$$\text{Economic Development} = a + \beta_1 \times \text{Self-Employment} + \beta_2 \times \text{Unemployment Rate} + \beta_3 \times \text{Number of Start-ups} + \beta_4 \times \text{Employment Rate}$$

Data Analysis and Findings

This section presents information on the results of the study after analysis on the impact of entrepreneurship on economic development. This study used the rate of self-employment data as a measure of entrepreneurial activity in the UK. The rate of self-employment in the UK has experienced rapid growth over the years as observed in data from the OECD. The number of self-employed individuals increased from 3.3 million people in 2001 to 4.8 million in 2017, i.e., the self-employed proportion of the labour force increased from 12% to 15% in the same period. This growth is attributable to the overall performance of the UK labour market which has shown significant resilience as the rate of unemployment rate fell to 4.4% in 2017 from 5.4% in 2000 as shown in figure 2 below.

Following the financial crisis, the aggregate employment has been supported by growth in self-employment and the number of employees. However, self-employment has contributed a larger proportion of the growth. Figure 2 below illustrates the employment net change from 2007 to 2016. Although employee jobs fell during and after the recession, self-employment increased in the same period contributing the most in employment growth up until the fourth quarter of 2014.

From table 3 below the annual average number of people who joined entrepreneurship from 2007 to 2016 was higher than of those who joined employment due to the prolonged period of job cuts experienced between 2009 and 2013.

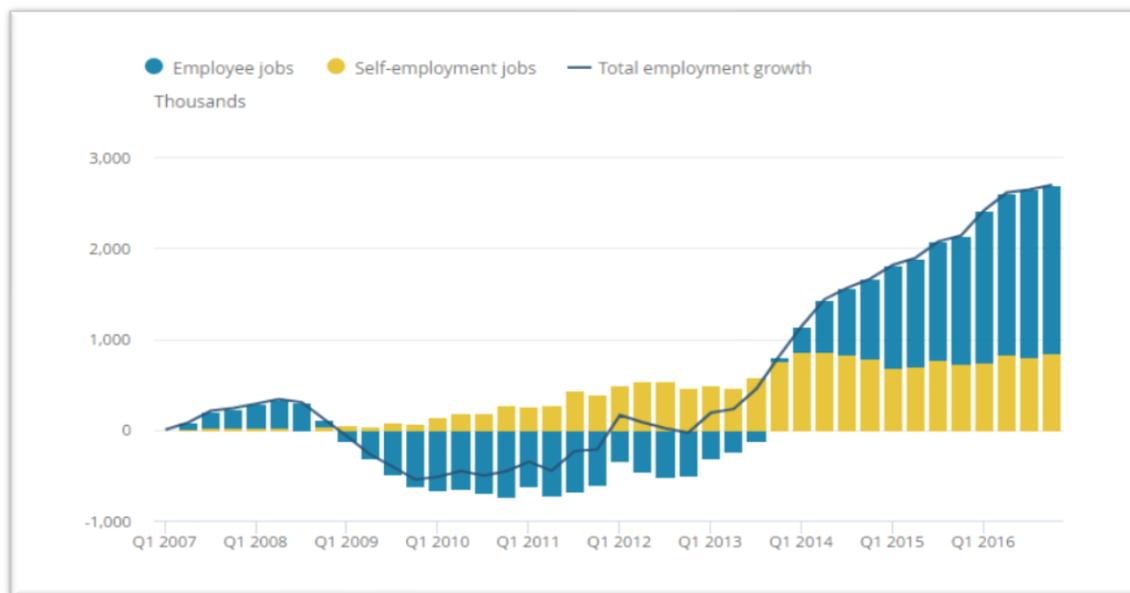


Figure 2: An Illustration of changes in Employment and Self-employment (2007-2016)

Table 3: Summary Statistics of Changes in Employees and Self-employed (2007-2016)

	<i>Employee jobs</i>	<i>Self-employment jobs</i>	<i>Total employment growth</i>
Mean	168	409	577
Standard Error	128	50	163
Median	26	453	198
Standard Deviation	808	316	1028
Sample Variance	652,620	99,697	1,056,775
Range	2587	861	3244
Minimum	-735	-2	-550
Maximum	1,852	859	2,694

Further analysis of the self-employment data into the nature and composition of the various ventures showed various notable traits. For instance, the number of self-employed people who worked with no employees has consistently increased from 2001 to 2016 as shown in figure 2 below while those with employees declined over the same period. The observation implies that the increase in the number of self-employed people is mainly driven by individuals working on their own without employees. As observed in table 4 below there were more self-employed individuals without employees than those with employees.

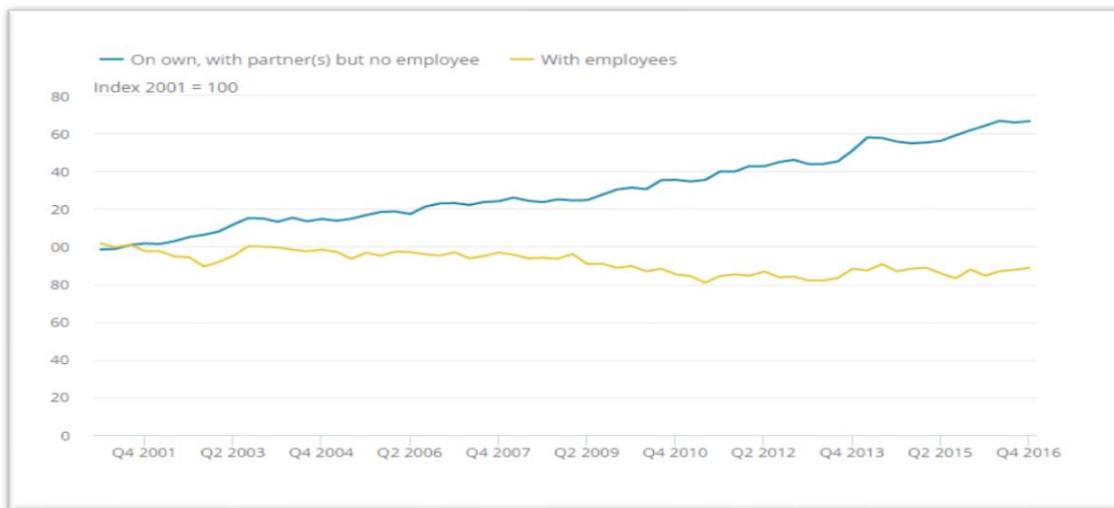


Figure 2: Trend in Self-employment With or Without Employees in the UK (Office for National Statistics, 2018)

Table 4: Summary Statistics of the Entrepreneurs with and Without Employees

	<i>On own, with a partner(s) but no employee</i>	<i>With employees</i>
Mean	130	92
Standard Error	2	1
Median	125	91
Mode	135	89
Standard Deviation	19	6
Sample Variance	372	33
Range	68	21
Minimum	99	81
Maximum	167	102

Employment versus Entrepreneurship

Following the observation of growth in the number of self-employed people a further analysis was required to evaluate the earnings for both employees and the self-employed. Figure 3 below shows the distribution of employee and self-employment weekly income for 2016. It is evident that both groups have a disparity in the level of income. Also, the most common level of earnings among the self-employed is lower than that among employees as the weekly wage among the employed is centered on £400 while that of the self-employed is centered on £240. The difference in enumeration between the self-employed and employed is mainly driven by differences such as the various industries of employment, the modes of payments or the average hours worked.

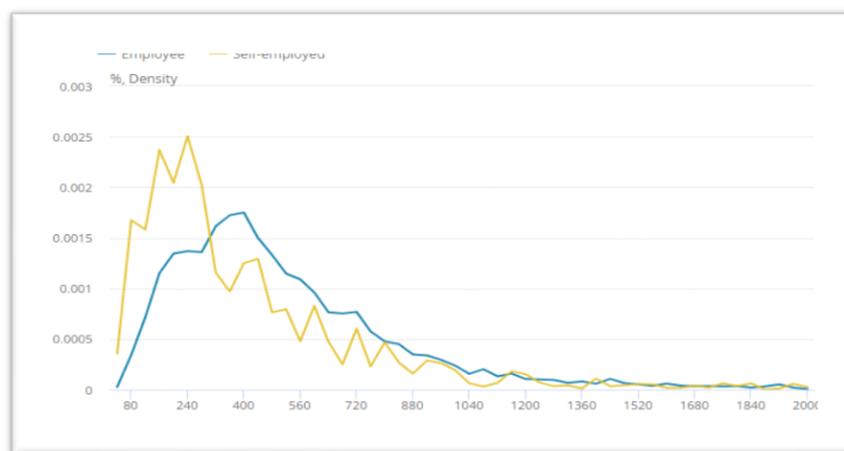


Figure 3: Income Distribution of Employee and Self-employed

Entrepreneurship by Region

A review of the self-employment data by region revealed that London had witnessed the most substantial increase of the percentage of the labor force in self-employment from 13% in 2001 to 17.4% in 2016 as shown in figure 4 below. Almost half all self-employed individuals are located in London, the South West and South East region.

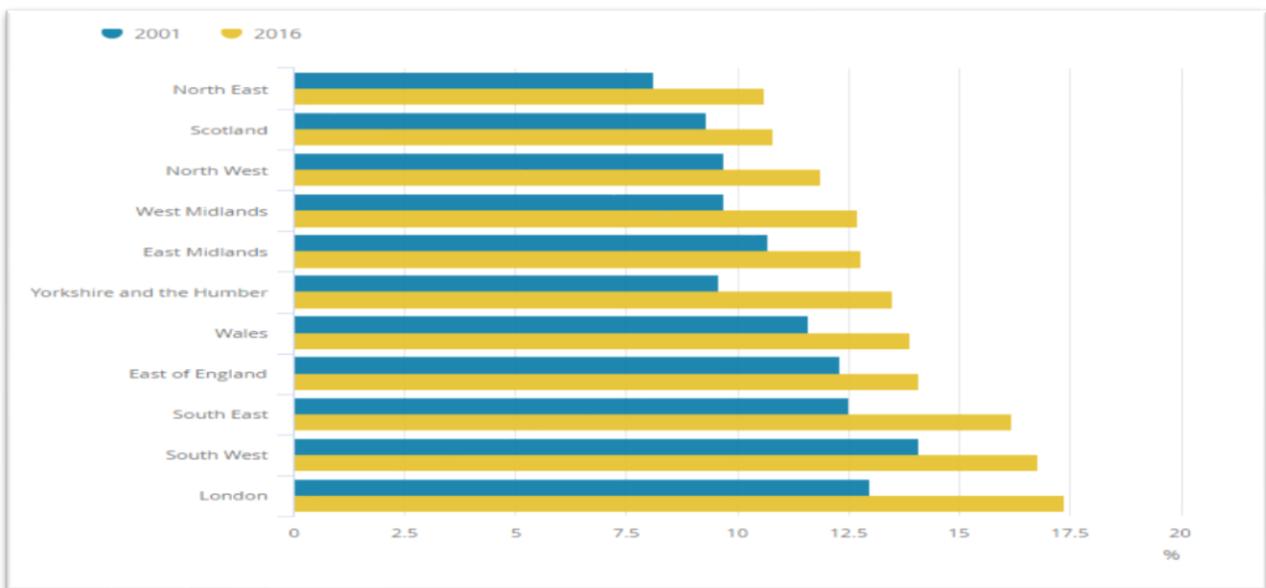


Figure 4: Regional Self-employment Data as a Proportion of the Labor Force

Entrepreneurship Income by Region

. The highest earners in the self-employed group are located in London based on the median weekly earnings. For the year ended 2016 the median wage for weekly self-employed was £352. As illustrated in figure 5 below the income from self-employment has increased across all regions from 2001 to 2016 except for North West region that has remained at £200.

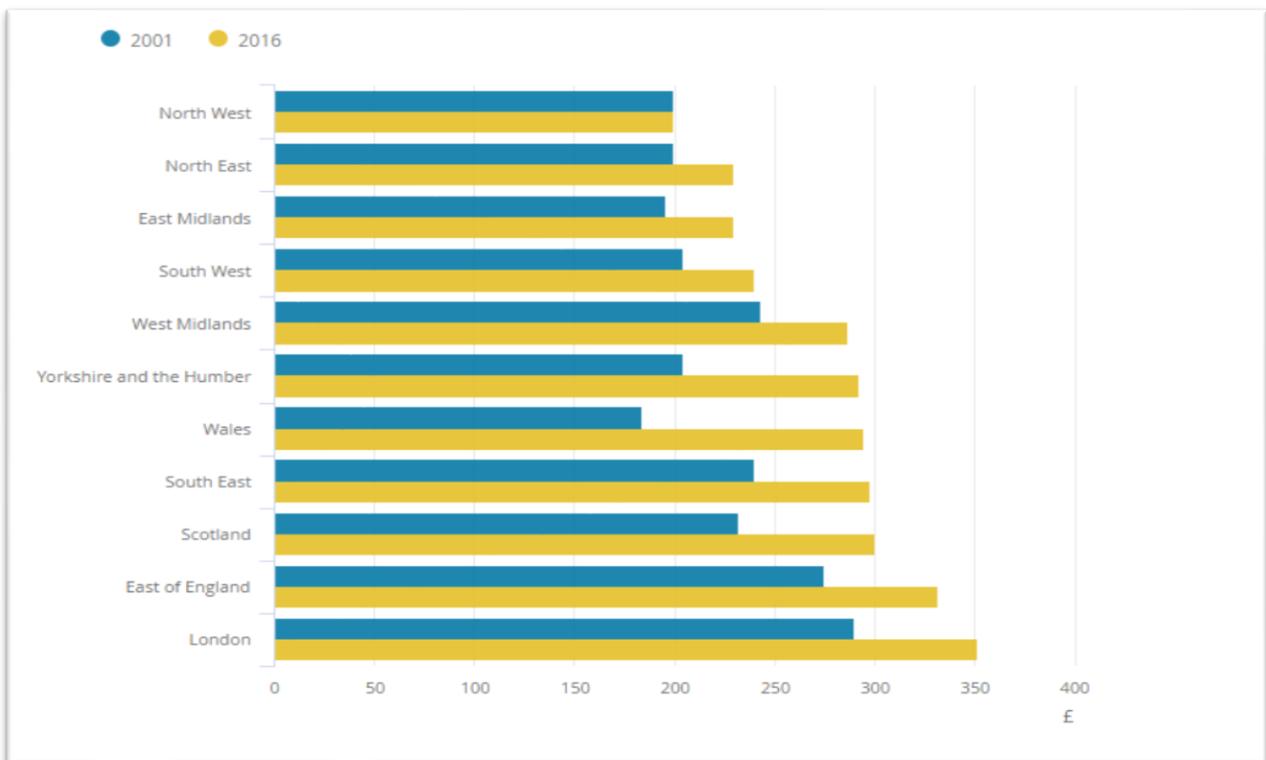


Figure 5: Self-employment Weekly Income by Region

Entrepreneurship by Age

It is evident that the number of self-employed individuals has steadily increased across all age groups over time. Following the financial crisis, those aged 65 and above seem to have moved into self-employment as the number of self-employed individuals in that age group increased from 134,000 in 2007 to 292,000 in 2016 as shown in figure 6. The 16 to 24 years age group has also witnessed a steady growth over the years while the 35 to 44 age group has increased marginally compared to the rest of the age groups. Table 5 below shows the summary statistics of the entrepreneurship by age data. The average number of self-employed people aged 65 and above is the highest.

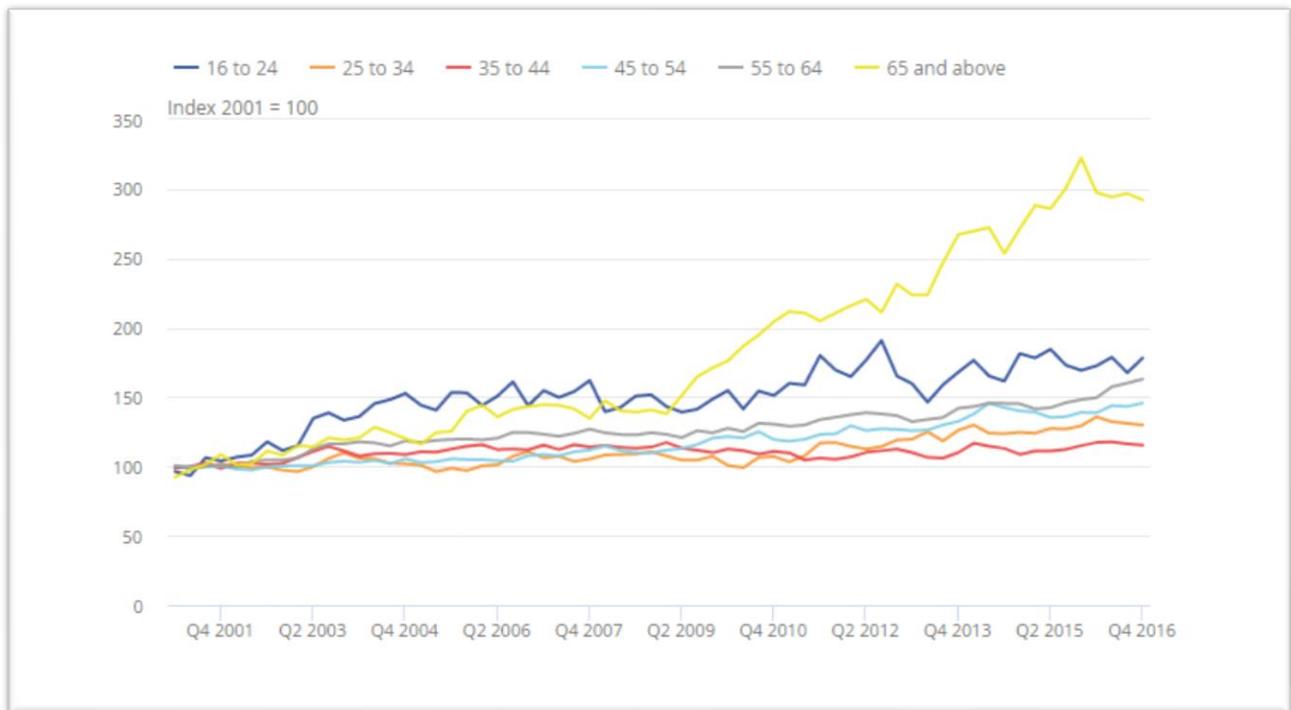


Figure 6: Number of Self-employed People by Age (2001-2016)

Table 5: Summary Statistics of the Self-employment by Age Data

	<i>16 to 24</i>	<i>25 to 34</i>	<i>35 to 44</i>	<i>45 to 54</i>	<i>55 to 64</i>	<i>65 and above</i>
Mean	150	110	110	117	127	180
Standard Error	3	1	1	2	2	8
Median	152	107	111	112	124	146
Mode	151	101	102	101	124	211
Standard Deviation	22	11	5	15	15	66
Sample Variance	502	120	22	218	229	4397
Range	97	40	19	48	65	230
Minimum	93	96	99	97	98	92
Maximum	191	136	118	146	163	322

Entrepreneurship by Level of Education

An analysis of the rate of self-employment suggests that those with a degree mainly drove the increase in self-employment between 2001 and 2016. The number of undergraduates in self-

employment increased from 101,700 in 2001 to 245,900 in 2016, i.e. an increase from 19.3% to 32.6% as a share of the aggregate self-employed individuals.

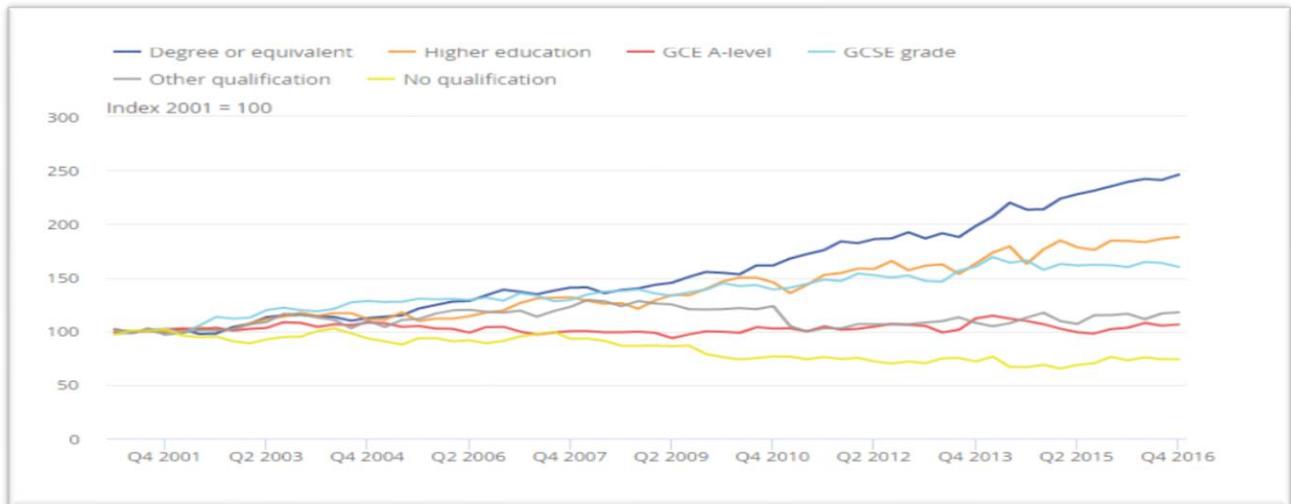


Figure 7: Self-employment by Level of Education

Table 6 below shows the descriptive statistics of the number of self-employed people from 2001 to 2016 in the UK. As observed, the average number of entrepreneurs with a degree or its equivalent was highest among the various education levels. Individuals with no qualification seem to have started the least number of business in the period under review.

Table 6: Summary Statistics of the Number of Self-employed People by the Level of Education (2001-2016).

	<i>Degree or equivalent</i>	<i>Higher education</i>	<i>GCE A-level</i>	<i>GCSE grade</i>	<i>Other qualification</i>	<i>No qualification</i>
Mean	156	138	103	137	112	84
Median	142	132	102	137	112	87
Mode	113	126	102	129	107	91
Standard Deviation	45	28	4	19	8	11
Sample Variance	2000	759	16	358	69	123
Range	148	88	21	72	33	38
Minimum	98	99	94	97	97	65
Maximum	246	188	115	169	129	103

The UK labour market has witnessed significant growth in the number of self-employed people over the years. As observed, various types of people have ventured into self-employment at different rates showing various underlying trends for each group. For instance, following the 2007 financial crisis the number of self-employed people aged 65 years and above increased significantly. Another significant observation is that the growth in self-employment between 2001 and 2016 is mainly driven by those with a degree qualification (or its equivalent). It suggests that highly-skilled individuals are moving into self-employment.

Unemployment Rate

The unemployment rate variable is measured as the year-on-year percentage change in the number of unemployed people. Data on unemployment in the UK from 2000 to 2017 shows that the unemployment rate was lowest in 2017 at 4.4%, i.e., 1.45 million people were unemployed. In 2000, the rate of unemployment was 5.4%, and it remained steady from 2001 to 2008 when it increased peaking at 8.1% in 2011 as shown in figure 8 below. Following the 2008 financial crisis, the UK's GDP declined to cause a gradual increase in the unemployment rate to its peak in 2011. With a falling real GDP, companies tend to decrease their output due to a decline in market demand or in extreme cases going out of business forcing them to close and as a result the unemployment increases. Also, changes in the economy resulting in a move from manufacturing to service-based lead to job loss as some unemployed workers lack the necessary skills to transition to other sectors. Although the economy has remained relatively stagnant, the unemployment rate has gradually declined since 2011. The declining unemployment rate is as a result of decreased real wages, greater labour market flexibility which encourages companies to keep on workers, and changes in policies that impact the ease of getting job seekers allowance thus forcing more people to seek employment. The average unemployment rate was 6.02% from 2000 to 2016 as shown in table 7 below.

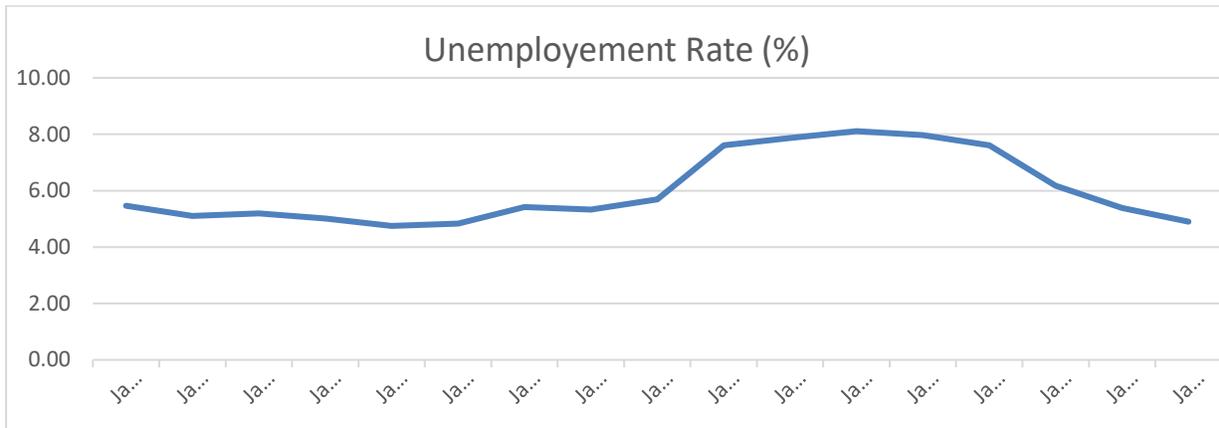


Figure 8: Unemployment Rate in the UK (2000-2016)

Table 7: Summary Statistics of UK’s Unemployment (2000-2016)

Mean	6.02
Standard Error	0.32
Median	5.44
Mode	7.61
Standard Deviation	1.26
Sample Variance	1.59
Range	3.36
Minimum	4.75
Maximum	8.11

Unemployment by Region

A breakdown of the 2017 unemployment data by region shows that the North East region had the highest unemployment rate, which was 6%, 1.7% higher than the average rate. South East England had the lowest rate of unemployment, at 3.2%, was 1.1% lower than the UK average. According to the unemployment data in the previous section, the North East England region had the lowest rate of self-employment which is further supported by the unemployment data.

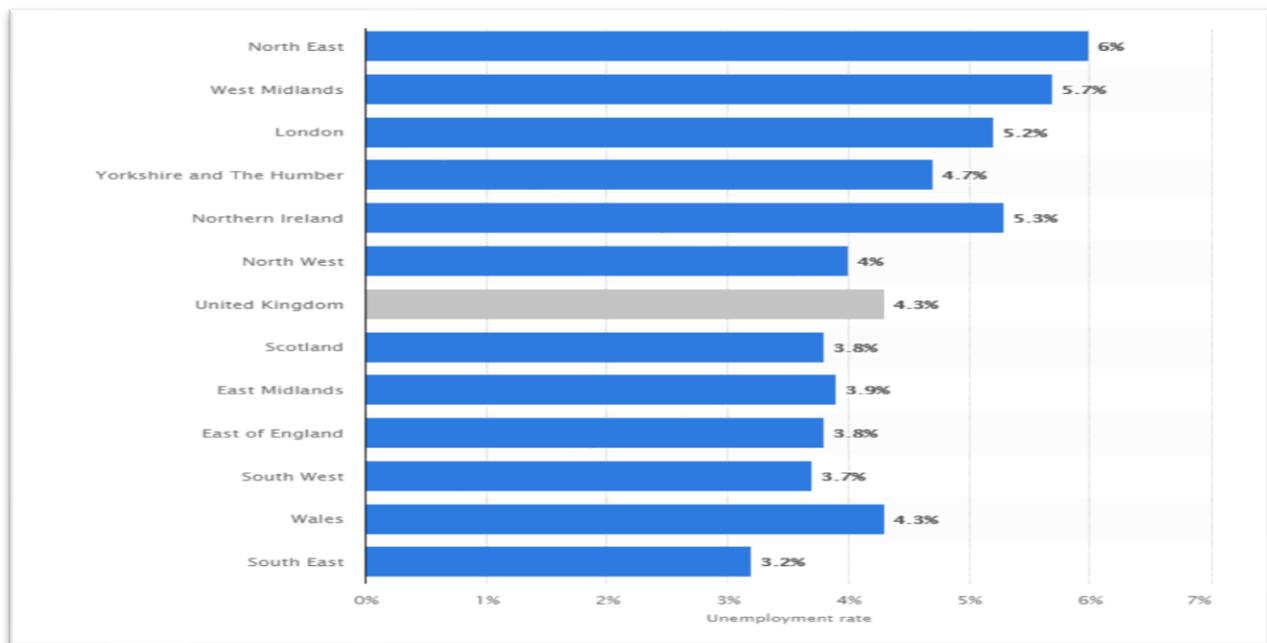


Figure 9: Unemployment Rate by Region (2017).

Number of Start-ups

The number of start-ups in the UK has consistently been on the rise from 2011 to 2016 as shown in figure 10 below. In 2016 the number of new firms established was 657,790 according to the data from Centre for Entrepreneurs up from 608,111 in 2015. The consistent growth has been as a result of government-sponsored initiatives aimed at encouraging people to start businesses following the financial crisis. For instance, the launch of a start-up scheme in 2012 has seen more than 46,000 start-ups receive more than £300 million in funding.

The annual average number of start-ups in the UK from 2011 to 2016 was 549,724 which puts it behind the US as a global leader in generating new businesses. The average annual growth in the number of start-ups during the same period was 8%. The data on start-ups is limited since it is not until 2011 that it received attention and was included among the economic metrics that are tracked. The data on the number of start-ups is limited to the last six years from 2011 to 2016. Therefore, the variable was not used in the regression model.

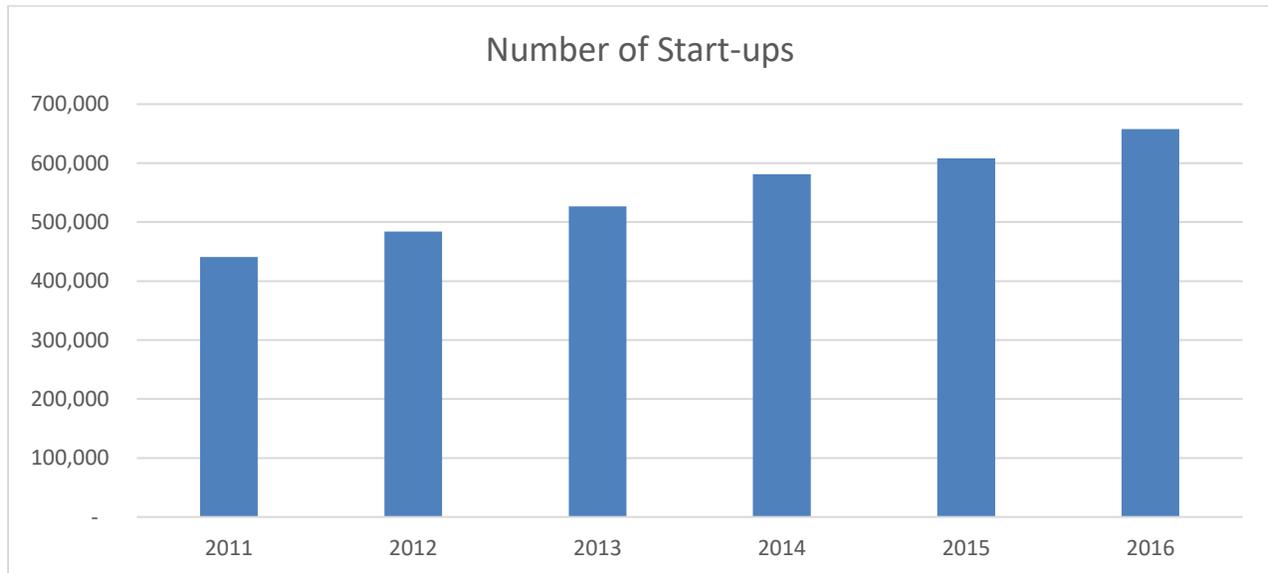


Figure 10: Number of Start-ups per Year

GDP per Capita

The GDP per capita is a measure of a country's total production as a function of the GDP and total population. It is determined by dividing the aggregate GDP for a given country with its total population. It enables the comparison of relative performance between countries. In this report, the dependent variable is the year-on-year percentage change in GDP per capita.

As earlier observed the per capita GDP is among the primary measures of economic performance and in this study the adjusted GDP is used to evaluate the impact of entrepreneurship on economic growth. The GDP per capita was £30,280 in 2016 when adjusted for purchasing power parity (PPP). As observed in figure 11 below, the GDP per capita has steadily grown following the 2008 financial crisis, from £28,032 in 2009 to £30,280 in 2016.

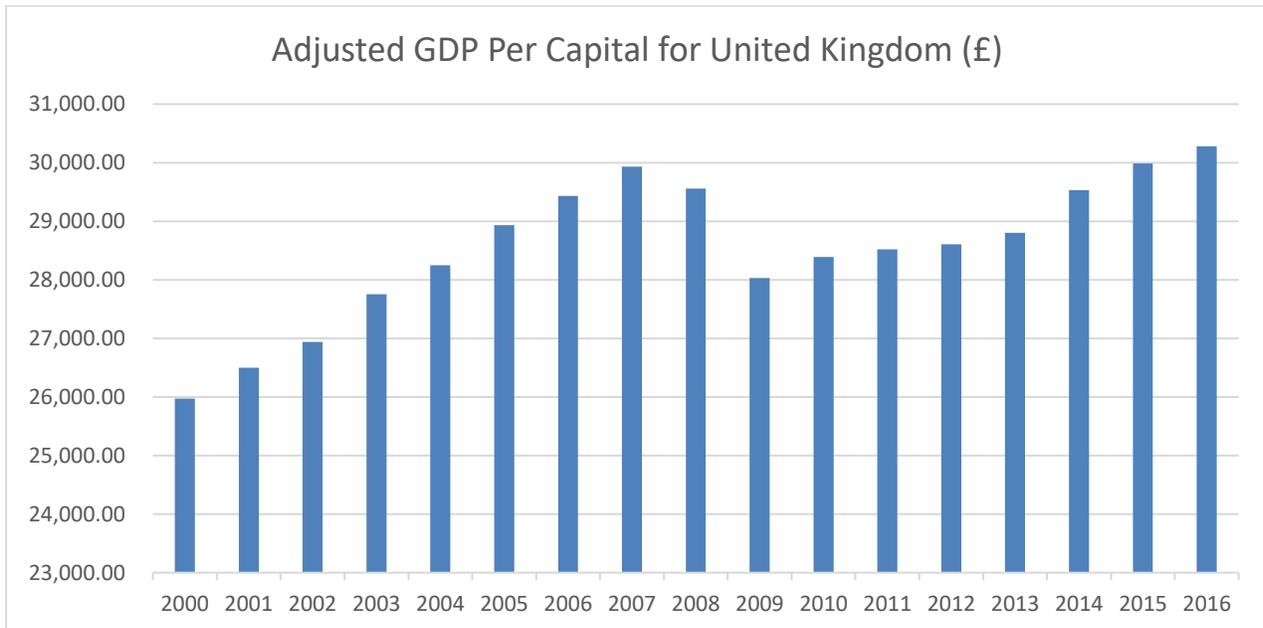


Figure 11: Adjusted GDP per Capita for the United Kingdom

Table 8 below shows the summary statistics for the UK adjusted GDP per capita. The average adjusted GDP per capita from 2000 to 2016 was £ 28,555 and the standard deviation in the same period was £1,235 suggesting that the measure has been marginally volatile. The peak level of economic productivity was achieved at £30,280 in 2016 while the lowest level was observed in 2000.

Table 8: Summary Statistics for the UK Adjusted GDP per Capita

Mean	28,555.4
Standard Error	299.48
Median	28,609.62
Standard Deviation	1,234.80
Sample Variance	1,524,724.61
Range	4,306.06
Minimum	25,974.89
Maximum	30,280.95

Correlation Analysis

Correlation analysis shows that the unemployment rate has a negative correlation with the GDP as shown in Table 9 below while it has a weak positive relationship with the rate of self-employment. The correlation test suggests that the rate of self-employment has a mild positive relationship with the GDP.

Table 9: Correlation Matrix

	<i>Unemployment Rate (%)</i>	<i>Annual % GDP Per Capita Change</i>	<i>% Change in Self-employment</i>
<i>Unemployment Rate (%)</i>	1		
<i>Annual % GDP Per Capita Change</i>	-0.4990	1	
<i>% Change in Self-employment</i>	0.1305	0.2290	1

Regression Analysis

The result from the regression analysis is shown in table 10 below. The output suggests that the relationship between the between entrepreneurship and economic growth can be expressed as:

$$\% \text{ in GDP per Capita} = 0.052 - (0.8163 \times \text{Unemployment Rate}) + (0.2896 \times \% \text{ Change in Self-employment}).$$

However, based on the t-statistic of the two independent variables, only the unemployment rate is significant at a 5% confidence interval. The rate of change in self-employment had a p-value of 0.2116 which is higher than the significance level. The adjusted R square is 0.2351 implying that the model explains only 23.51% variability of the response variable.

Table 10: Regression Analysis Summary

<i>Regression Statistics</i>								
Multiple R	0.5806							
R Square	0.3371							
Adjusted R Square	0.2351							
Standard Error	0.0171							
Observations	16							
<i>ANOVA</i>								
	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>			
Regression	2	0.0019	0.0010	3.3051	0.0691			
Residual	13	0.0038	0.0003					
Total	15	0.0057						
	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>	<i>Lower 95%</i>	<i>Upper 95%</i>	<i>Lower 95.0%</i>	<i>Upper 95.0%</i>
Intercept	0.0520	0.0214	2.4369	0.0299	0.0059	0.0982	0.0059	0.0982
Unemployment Rate (%)	-0.8163	0.3455	-2.3625	0.0344	-1.5628	0.0699	-1.5628	-0.0699
% Change in Self-employment	0.2896	0.2204	1.3138	0.2116	0.1866	0.7657	0.1866	0.7657

Discussion

To comprehensively address the primary objective of the study this report addressed the following questions to enhance the quality of the research: Entrepreneurship in the UK and what factors influence it? What factors impact economic development? What is the most appropriate measure of economic growth? Does entrepreneurship affect economic growth?

Entrepreneurship in the UK

The rate of entrepreneurship in the UK has experienced rapid growth over the last 16 years based on the growth in the number of self-employed individuals. The number of self-employed individuals increased from 3.3 million in 2001 to 4.8 million in 2017 making an increase in the proportion of self-employed individuals in the labour force from 12% to 15% in the same period. This growth was as a result of the overall performance of the UK labour market which decreased to 4.4% in 2017 from 5.4% in 2000.

The number of people in employment fell during and after the recession, whereas self-employment numbers increased in the same period contributing the most in employment growth up until the fourth quarter of 2014 suggesting that more people turned to self-employment. Based on the self-employment data, 71% of the net aggregate employment growth was as a result of entrepreneurship. The annual average number of start-ups in the UK from 2011 to 2016 was 549,724 which puts it behind the US as a global leader in generating new business. The average annual growth in the number of start-ups during the same period was 8%. The data on start-ups only went back to 2011 as it was not tracked along with other economic metrics.

The level of income earned by entrepreneurs varies across the various regions. The highest earners in the self-employed group in the UK are located in London based on the median weekly earnings. For the year ended 2016 the median wage for weekly self-employed individuals in London was £352. The level of education is a significant factor of entrepreneurship as the analysis of the rate of self-employment suggests that those with a degree mainly drove the increase in self-employment between 2001 and 2016. The number of undergraduates in self-employment increased from 101,700 in 2001 to 245,900 in 2016, i.e. an increase from 19.3% to 32.6% as a share of the aggregate self-employed individuals.

Impact of Entrepreneurship on Economic Growth

The regression analysis model suggests that the relationship between the between entrepreneurship and economic growth can be expressed as:

$$\% \text{ in GDP per Capita} = 0.052 - (0.8163 \times \text{Unemployment Rate}) + (0.2896 \times \% \text{ Change in Self-employment}).$$

The coefficients obtained suggest that the rate of unemployment negatively contributes to economic growth while the change in self-employment has a positive relationship with employment. As earlier disused, unemployment is a push-factor for entrepreneurship as evidenced by the increase in self-employment after the economic recession. However, the results from the

regression analysis suggest that it has a negative impact on economic growth. The p-value of unemployment rate variables is less than 0.05 implying that coefficient is significant at a 5% confidence interval. The self-employment variable has a p-value less than 0.05 suggesting that the coefficient is not relevant in the model at a 5% confidence interval. The adjusted R square is 0.2351 implying that the model explains only 23.51% variability of the response variable. Therefore, the level of entrepreneurship only explains 23.51% of the change in GDP. Although the rate of self-employment has a positive relationship with the economic development, it is not a significant variable for the model.

Conclusion and Recommendation

There has been a structural shift in the industrial sector towards more reliance on flexibility and knowledge-intense production. Therefore, entrepreneurship has become an essential aspect in achieving economic growth. Small firms are more innovative in the various sectors and tend to explore new fields. They tend to employ more people than the large corporation as they are significantly more in number spread across the multiple sectors. Innovation is an essential factor influencing the success of small firms as they do not enjoy economies of scale and have limited resources compared to larger firms.

The analysis conducted on the employment rate in the UK suggests that more jobs were created through self-employment. The self-employment rate is higher than the employment rate. It illustrates the extent to which small firms have a significant impact on net employment creation and generating economic growth through a high rate of gross job creation in an economy.

The study showed that the level of education significantly contributed to the self-employment rate. Therefore, an individual with education is likely to have more internal and external factors that serve as motivation for entrepreneurship. The study also revealed that in the UK, self-employment had gained popularity especially for people aged 65 and above. It was observed that following the financial crisis, more individuals ventured into self-employment. The adverse effects of the recession such as job loss and inflation were push factors for entrepreneurship.

The regression model depicting the relationship between economic growth and entrepreneurship pointed to a negative correlation between the unemployment rate and economic growth. Therefore, although unemployment is considered a push factor for entrepreneurship, it has a net adverse effect on economic growth. Self-employment has a positive impact on the rate of economic growth as the coefficient of the model suggested. However, it is not a significant factor in economic growth as observed. Therefore, the study suggests that entrepreneurship is not a significant factor in economic growth when measured using the rate of self-employment. Self-employment is,

however, a weighty contributor to job creation which helps to cap the unemployment rate which negatively affects economic growth.

Recommendations for Future Studies

The theoretical review of entrepreneurship showed that the link between entrepreneurship and economic growth is mostly skewed towards innovation. Therefore, there is a need to examine the entrepreneurship from other various perspectives such as competition. Ideally, the number of start-ups impacts economic development through both increased competition and creation of new employment. Research on the net effect following increased innovation and competition is has remained minimal. This is a highly recommended area of research to build on the current literature.

There have been numerous studies on the effects of entrepreneurship employing multiple instruments and methods. It would be valuable to make an evaluation of the various approaches used and compare their reliability and validity to establish their relative performance. Such an assessment would be beneficial for future studies by constructing operational tools.

References

- Acs, Z. J., & Audretsch, D. B. (2001). *The emergence of the entrepreneurial society*. Swedish Foundation for Small Business Research.
- Akcigit, U. (2017). Economic Growth: The Past, the Present, and the Future. *Journal of Political Economy*, 125(6), pp.1736-1747.
- Almeida, P., & Phene, A. (2004). Subsidiaries and knowledge creation: The influence of the MNC and host country on innovation. *Strategic Management Journal*, 25(8-9), 847-864.
- Al-Moulani, A. & Alexiou, C. (2017). Banking sector depth and economic growth nexus: a comparative study between the natural resource-based and the rest of the world's economies. *International Review of Applied Economics*, 31(5), pp.625-650.
- Baldwin, J. R., & Johnson, J. (1999). Entry, innovation and firm growth. In *Are small firms important? Their role and impact* (pp. 51-77). Springer, Boston, MA.
- Baumol, W. J. (1993). Formal entrepreneurship theory in economics: Existence and bounds. *Journal of business venturing*, 8(3), 197-210.
- Beck, T., Demirgüç-Kunt, A., & Levine, R. (2001). Law, politics, and finance. *World Bank Policy Research* Working Paper No. 2585. Available at SSRN: <https://ssrn.com/abstract=269118>

- Bleaney, M., & Nishiyama, A. (2002). Explaining growth: a contest between models. *Journal of Economic Growth*, 7(1), 43-56.
- Braunerhjelm, P. (2010). Entrepreneurship, Innovation and Economic Growth-past experience, current knowledge and policy implications.
- Carree, M., Van Stel, A., Thurik, R., & Wennekers, S. (2002). Economic development and business ownership: an analysis using data of 23 OECD countries in the period 1976–1996. *Small business economics*, 19(3), 271-290.
- Cecchetti, S.G. & Kharroubi, E. (2015). Why does financial sector growth crowd out real economic growth? CEPR Discussion Paper No. DP10642. Available at SSRN: <https://ssrn.com/abstract=2615882>
- Coyle, D. (2014). *GDP: A brief but affectionate history*. Princeton: Princeton University Press
- Dejardin, M., & Fritsch, M. (2011). Entrepreneurial dynamics and regional growth. *Small Business Economics*, 36(4), 377-382.
- Eliasson, G., & Braunerhjelm, P. (1998). *Intangible, human-embodied capital and firm performance*. Industriens utredningsinstitut (IUI)
- Haltiwanger, J., & Krizan, C. J. (1999). Small business and job creation in the United States: The role of new and young businesses. In *Are small firms important? Their role and impact* (pp. 79-97). Springer, Boston, MA.
- Hébert, R. F., & Link, A. N. (1989). In search of the meaning of entrepreneurship. *Small business economics*, 1(1), 39-49.
- Heshmati, A. (2001). On the growth of micro and small firms: evidence from Sweden. *Small business economics*, 17(3), 213-228.
- Hodgson, D. (2016). *The New Worlds of Thomas Robert Malthus: Rereading the Principle of Population*. Princeton: Princeton University Press.
- Karlsson, C., Friis, C., & Paulsson, T. (2006). Entrepreneurship and Economic Growth: A Critical Review of Empirical and Theoretical Research.
- Kobeissi, N. (2010). Gender factors and female entrepreneurship: International evidence and policy implications. *Journal of International Entrepreneurship*, 8(1), 1-35.

- Krugman, P. (1991). Increasing returns and economic geography. *Journal of political economy*, 99(3), 483-499.
- Leimbach, M., Kriegler, E., Roming, N. & Schwanitz, J. (2017). Future growth patterns of world regions—A GDP scenario approach. *Global Environmental Change*, 42, pp.215-225.
- Mahravan, A. & Vale, B. (2017). The Sustainable Portion of Gross Domestic Product: A Proposed Social Ecological Economic Indicator for Sustainable Economic Development. In *Sustainable Building and Built Environments to Mitigate Climate Change in the Tropics* (pp. 53-69). Springer, Cham.
- Moore, C. F. (1986). Understanding Entrepreneurial Behavior: A Definition and Model. In *Academy of Management Proceedings* (Vol. 1986, No. 1, pp. 66-70). Briarcliff Manor, NY 10510: Academy of Management.
- OECD (Organisation for Economic Co-operation and Development). (1998). Fostering entrepreneurship and Firm Creation as a Driver of Growth in a Global Economy.. Available at <http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.454.1528&rep=rep1&type=pdf>
- Olsson, O., & Frey, B. S. (2002). Entrepreneurship as recombinant growth. *Small Business Economics*, 19(2), 69-80.
- Porter, M. E. (1996). Competitive advantage, agglomeration economies, and regional policy. *International regional science review*, 19(1-2), 85-90.
- Reynolds, P. L., & Lancaster, G. (2006). A scheme to increase profitability in entrepreneurial SMEs. *Journal of Small Business and Enterprise Development*, 13(3), 395-410.
- Rothwell, R., & Zegveld, W. (1982). Innovation and the small and medium sized firm. University of Illinois at Urbana-Champaign's Academy for Entrepreneurial Leadership Historical Research Reference in Entrepreneurship. Available at SSRN: <https://ssrn.com/abstract=1496714>
- Saunders, M. N., Lewis, P., Thornhill, A., & Bristow, A. (2015). Understanding research philosophy and approaches to theory development. Available at https://www.researchgate.net/publication/309102603_Understanding_research_philosophies_and_approaches
- Schumpeter, J. A. (1934). Change and the Entrepreneur. *Essays of JA Schumpeter*.

-
- Tur-Porcar, A., Roig-Tierno, N., & Llorca Mestre, A. (2018). Factors Affecting Entrepreneurship and Business Sustainability. *Sustainability*, 10(2), 452.
- Vosloo, W. B. (1994). The small firm as a vehicle for entrepreneurship. *Entrepreneurship and Economic Growth*. HSRC Publishers, Pretoria.
- Vossenbergh, S. (2013). Women Entrepreneurship Promotion in Developing Countries: What explains the gender gap in entrepreneurship and how to close it. *Maastricht School of Management Working Paper Series*, 8, 1-27.
- Wennekers, S., & Thurik, R. (1999). Linking entrepreneurship and economic growth. *Small business economics*, 13(1), 27-56.
- Wennekers, S., Van Wennekers, A., Thurik, R., & Reynolds, P. (2005). Nascent entrepreneurship and the level of economic development. *Small business economics*, 24(3), 293-309.
- Yan, W. & Yudong, Y. (2003). Sources of China's economic growth 1952–1999: incorporating human capital accumulation. *China Economic Review*, 14(1), pp.32-52.
- Yu, T. F. (1997). Entrepreneurial state: the role of government in the economic development of the Asian newly industrialising economies. *Development Policy Review*, 15(1), 47-64.