

The Governance foundation



**Growth, Productivity and Precarious
Self-employment in the UK**

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1. The Productivity Conundrum

Conflicting data from the Office of National Statistics (ONS) on employment, unemployment and Gross Domestic Product (GDP) has created a dilemma for economists. In the initial stages of the financial crisis in 2008, the fall in employment was much slower than the decline in GDP would have predicted; and in a second phase, from 2011, real GDP fell while employment grew. In 2012, growth was negative in three of the four quarters, the exception being the quarter in which the Olympic Games took place in London. Counter-intuitively, as GDP declined or stagnated, employment continued to rise and unemployment fell.

As a result, the level of productivity, the amount of economic output that is produced by a unit of labour input, declined¹. Depending on who was carrying out the analysis and what starting and end dates were used, productivity measured as output per worker, was said to be between 10 and 16 per cent lower than might have been expected on the basis of previous experience². For output per hour worked, the ONS's preferred measure of productivity since it takes into account the average hours worked in an economy, the results were similar³.

Economists have suggested a number of reasons for the apparent discontinuity between the growth figures and the changes in employment. The data provoked a debate over whether the GDP figures were wrong, the employment data were faulty, the jobs that had been created were in low-productivity involuntary part-time employment, employers were hoarding skilled labour in anticipation of the upturn, capital intensive sectors that employ little labour were suffering lower levels of output than labour-intensive sectors, and the banks were continuing to direct resources to over-staffed low-productivity firms, rather than investing in new dynamic firms and sectors.

¹ Economic output is inflation-adjusted Gross Value Added (GVA). GVA is the difference between the value of goods and services produced (the output) and the cost of the raw materials and other inputs which are used in production (the intermediate consumption). Productivity = Real GVA/workers or Real GVA/hours. (<http://www.ons.gov.uk/ons/rel/productivity/labour-productivity/q3-2013/info-labour-productivity.html>).

² Patterson, P. (2012) The Productivity Conundrum, Explanations and Preliminary Analysis, 16 October, London, ONS, p. 4. Available at: http://www.ons.gov.uk/ons/dcp171766_283259.pdf; Bank of England (November 2012) Inflation Report, London, Bank of England; Barnett, A., Batten, S., Chiu, A., Franklin, J. and Sebastia-Barriel, M. (2014) The UK Productivity Puzzle, *Bank of England Quarterly Bulletin 2014 Q2*, p. 115.

³ Barnett, et al. (2014) op. cit., p. 116.

This led the ONS to set up several work-streams relating to what it refers to as a 'productivity conundrum'⁴ and the Bank of England have also closely examined the phenomenon⁵. The ONS examined some of the possible reasons for this puzzle and concluded that there is no single factor that can account for it. They have argued that there are likely to be several broad forces at work, such as the impact of the banking crisis, the reaction of companies, the flexibility of the labour market and the sectoral composition of the economy⁶. They have looked in detail at the structure of the economy, the role of the financial sector, the behaviour of supply, the behaviour of companies, the flexibility of the labour market and the possibility of measurement errors in GDP estimates. The ONS has also investigated micro-data on incorporated businesses in key sectors of the economy up to 2009 to try to shed some light on the matter⁷.

In 2012, the Bank of England set out 11 potential explanations for the productivity shortfall, three of which were related to data⁸. Other possible explanations considered by the Bank at that time were: retention of staff by companies, out of necessity or choice; more effort being devoted to generating custom because demand is subdued; increased cost, and reduced availability of working capital; weaker business investment and lower take-up of innovative products and processes; impediments to the allocation of resources to companies with the greatest potential to boost productivity, and to the reallocation of capital as the economy rebalances; new and expanding companies may have used more labour-intensive methods of production; misallocation of labour and skills, for example if opportunities for career progression have diminished; more effort being devoted to activities that are essential to the functioning of the business (e.g. regulation).

There may be elements of truth in most or all of the above explanations for the unexpected outcomes in the growth and employment information. They do not

⁴ Grice, J. (2012) The Productivity Conundrum, Interpreting the Recent Behaviour of the Economy, 24 August, ONS. Available at http://www.ons.gov.uk/ons/dcp171766_277262.pdf. Patterson, op.cit.

⁵ Bank of England (2013) *Inflation Report 2012*, Section 3, Output and Supply, pp. 25-33, November; Bank of England (2014) *Annual Report 2014*, p. 25

⁶ Patterson op. cit.

⁷ Field, S. and Franklin, M. (2013) Micro-data perspectives on the UK productivity conundrum, 16 January, ONS, available at: http://www.ons.gov.uk/ons/dcp171766_295470.pdf.

⁸Bank of England (November 2012) *Inflation Report*, London, Bank of England

however, either singly or in combination, provide us with a full explanation for what appears to be a 'job-rich depression'⁹. At the time of writing this paper, the most recent assessment of the factors contributing to an apparent 16% shortfall in UK labour productivity relative to the pre-crisis trend is that between six and nine percentage points remain unexplained¹⁰.

The one possible explanation that the ONS explicitly rejected was that there could be an issue with their GDP data. The ONS said it found no evidence of bias in the early estimates of GDP growth, for these were consistent with the information provided by other business surveys and with information on tax revenues. In addition, the ONS analysis of the micro-data on incorporated businesses did not support the proposition that there is a problem with the GDP data. When their 2012 estimates were updated, it was demonstrated that there was more growth in the economy than originally thought, but this did not eliminate the growth/employment puzzle. An anticipated and feared triple dip recession did not materialise and a double dip was eliminated by the better than anticipated final growth figures. The changes, however, were marginal and, although the pressure to explain the productivity puzzle was reduced, the conundrum remained.

The possibility of a problem with the data was also addressed by the Bank of England. In the context of an estimated 10% productivity shortfall in 2012, the three data issues considered by the Bank of England were: current data exaggerate the weakness in output growth; current data exaggerate the strength in employment growth; and past rates of productivity growth do not provide a good guide to the future trends. After considering these possible explanations, the Bank commented as follows¹¹:

1. Current data exaggerate the weakness in output growth:
The broad pattern of output growth is supported by other activity indicators, suggesting that any revisions are likely to be small. Based on the MPC's central backcast, this is likely to account for only around 1 percentage point of the shortfall.

⁹ The Economist (2013) A Dive into Britain's productivity puzzle uncovers a serious risk to the economy, 26 January. Available at: <http://www.economist.com/news/britain>.

¹⁰ Barnett et al. (2014) *op.cit*, p.125.

¹¹ Bank of England (November 2012) Inflation Report, London, Bank of England, p.33.

2. Current data exaggerate the strength in employment growth:
LFS data could overstate the strength of labour demand. But LFS data are corroborated by Workforce Jobs data. And even in the extreme case that the newly self-employed since mid-2010 had yet to produce any output, that would account only for about 1 percentage point of the shortfall.
3. Past rates of productivity growth do not provide a good guide to the future trends:
A structural decline in energy extraction output and more sustainable rates of productivity growth in the financial services sector could together account for 1 to 2 percentage points of the productivity shortfall.

In 2012, therefore, the Bank considered that these data issues could have accounted for up to 4 percentage points of the 10% productivity shortfall. After 2012, however, as the productivity puzzle appears to deepen, the data issue was discounted. The Bank of England's Annual Report for 2014 points out that in 2013 Q3, productivity was 'some 16% below the level that would have prevailed had it continue to grow in line with its pre-crisis trend'¹². Economists in various sections of the Bank have been working together, in collaboration with the ONS and others, to try to explain the puzzle. This work resulted in four key insights that have helped identify a range of influences on UK productivity and have informed the work of the Monetary Policy Committee (MPC), the Financial Policy Committee (FPC) and the Prudential Regulation Authority (PRA). The key issues are now thought to be¹³:

- The role of credit provision;
- Innovation, research and development;
- The desire to retain skilled workers across different firms and sectors; and
- Workers' willingness to accept lower real wages in order to stay in jobs.

The data problems of two years earlier appear to have slipped out of sight. The economy is growing, employment is increasing and, for whatever reason, there appeared to be a reluctance to further examine the issue of data reliability. The issue was taken up again by Barnett et al., who again pointed out that data measurement issues could account for 4% of the 16% shortfall¹⁴.

In setting aside the idea that there could be a problem with the quarterly data on GDP, there were two issues that the ONS and the Bank of England did not consider:

¹² Bank of England (2014) *Annual Report 2014*, London, Bank of England, p. 25.

¹³ Bank of England (2014) *op. cit.*, p. 25.

¹⁴ Barnett et al. (2014) *op. cit.*, p.118.

the possibility that there was an error that was consistent across the GDP data, business surveys and information from Her Majesty's Revenue and Customs (HMRC); and that the main data measurement issue was concerned with the relationship between two data sets, rather than errors in one or the other.

One would naturally assume that finding the same error in all the indicators is highly unlikely. The proposition that all official and industry sources are making the same mistake is difficult to accept. It would be very unusual. Nevertheless, it can be argued that the survey and tax data do indeed reinforce a bias in the ONS GDP calculations. This is because none of the sources cover the very smallest and most precarious firms, which have been growing significantly over a long period of time but particularly since the beginning of the recession.

Part of the reason for the productivity conundrum is that a growing proportion of the UK economy is being recorded in the quarterly employment figures but has been falling out of the scope of other official statistics. The growth of these small firms, which as we shall see are increasingly precarious in a number of ways, contributes to the explanation of what appears as a conundrum. The Bank argues that in an extreme case, where all the newly self-employed generated no additional output, the rise in self-employment during the crisis would account for only one or two per cent of the shortfall in measured productivity¹⁵. However, a possible explanation, which has to be given more consideration in thinking about long-term and cyclical conditions in relation to productivity, is that we have seen a rapid growth of *precarious self-employment* in the UK, the output of which is not captured by the quarterly GDP figures and other sources. At the heart of the economists' dilemma is a massive increase in self-employment, particularly part-time self-employment and especially in the post-crisis period after 2008. There has been a steady growth in part-time self-employment for more than 20 years but, in the five years between 2008 and 2012 in particular, the rapid growth in part-time self-employment sits in stark contrast with a large decline in full-time employees over the same period.

¹⁵ Bank of England (November 2012) Inflation Report, London, Bank of England, p.33; Barnett, et al. (2014), *op. cit.*, p.118.

Most of these small firms, unregistered for VAT and PAYE, are not included in the sources that are used to provide quarterly estimates of GDP. It has to be recognised that the contribution of unregistered firms to GDP is likely to be small. BIS calculates that their turnover may be no more than 3% of all turnover in the UK¹⁶. There is nevertheless a question about how and when the value of these goods and services is included in the calculations of GDP. The main issue here, however, is not the size of their contribution to GDP but the way they are used in calculating productivity: that is, their introduction into the denominator of the productivity equation but not the nominator – when the value of production and services is divided by jobs or hours.

In considering the issue of data reliability, the Bank of England did look at the employment statistics but, since they were consistent with the Workforce Jobs data¹⁷, it was concluded that there was no problem. They therefore looked at both the growth and employment statistics and considered that any errors were minimal. However, the Bank looked at the two parts of the productivity equation separately. Is there a problem with the output data: yes or no? Is there a problem with the employment data: yes or no? What the Bank did not do was focus on the relationship between the two datasets¹⁸.

A possibility they did not consider was that the data on output and employment taken separately may not greatly exaggerate the weakness or strength of what was really happening in the economy, but the historical way they have been brought together to measure productivity is no longer fit for purpose. The problem derives from an underlying weakness in the way the data are combined on a quarterly basis, without due attention to the relationship between the ways the data are gathered and the changes that have taken place in the economy over time. There is a fundamental question about the impact that different survey methodologies have on the way the

¹⁶ Jones, J. (2014) E-commerce: measuring, monitoring and gross domestic product, ONS, August. <http://www.ons.gov.uk/ons/guide-method/method-quality/specific/economy/national-accounts/articles/2011-present/e-commerce--measuring--monitoring-and-gross-domestic-product.pdf>. See Table 4 of this document.

¹⁷ This is a compound source that draws on employer surveys, household surveys and administrative sources. It is the sum of employee jobs measured primarily by employer surveys, self-employment jobs from the Labour Force Survey, and government-supported trainees and Her Majesty's Forces from administrative sources (www.london.gov.uk)

¹⁸ Bank of England (2014) *op. cit.*; Barnett, et al., *op. cit.*, p.118.

relationship between the employment and output measures is calculated. The main problem is a relational one, not an absolute one.

In the struggle to solve the riddle of falling growth and rising employment that is the basis of the productivity conundrum, there are therefore two interrelated but conflicting drivers: the first is the two different methodologies that are used by the ONS to collect the data and the second is the long-term structural changes in the UK economy. The combined effect of two different ONS survey methods for employment and GDP, along with the increase in insecure part-time employment that has been taking place over the last 20 years but which has accelerated recently, have been producing employment figures that capture a new economic reality and growth figures that do not. When the two sets of figures are brought together every quarter in a productivity equation, the inconsistent methodologies feed the conundrum.

While the debate about the productivity conundrum is carried out on the basis of the quarterly data, information about the contribution of the self-employed to GNP does not appear in the statistics until the very end of the data collection process. The annual Blue Book is produced around 18 months after the end of the year it covers. This is the first opportunity to incorporate information on the contribution of the self-employed.

A number of different tools and models are used for the GDP data. Overall, there are three approaches, which are theoretically equal, using data on output (or production), expenditure and income. The preliminary quarterly estimates are based on information on output only. The second and third quarterly estimates include updated output data, along with new expenditure and income data, but it is not until the Blue Book is produced that the HMRC's income data is included for the self-employed.

In the UK, there are far more data available on output than on income or expenditure. The rate of change of output is therefore used to calculate the rate of change of the first estimate of GDP but as more data from the other approaches become available, estimates are improved and revised by incorporating information on income and expenditure (Lee, 2012). Bank of England staff expect that the latest

levels of GDP will ultimately be revised upwards but that the impact of the revisions will be very small¹⁹. However, there are no sources for the unregistered self-employed included in any of the quarterly estimates.

It is therefore important to consider in more detail the methods of measurement and how the revisions take place, before going on to discuss what we should expect to find when the annual GDP figures are finalised. First, we will look in more detail at the data-gathering methodology that is used for the quarterly estimates of production and productivity, before going on to look at the growth of part-time and unregistered self-employment and how information about these groups is incorporated into growth and productivity estimates. Finally, we will investigate the possible impact of three different scenarios for the growth of unregistered small firms on how productivity is calculated.

2. ONS Data Gathering and the Unregistered Self-employed

The ONS data sets for quarterly GDP and employment estimates rely on survey methods. The GDP information is gathered using business surveys and the labour force information is based on a household survey. The sampling methods that are used in these surveys are necessarily different - and the differences are significant

The employment data that derive from the Labour Force Survey includes information on age, gender, disability, unemployment and an array of employment information for every member of a household over the age of 16. It identifies, for example, levels of participation in the labour force, the sector of employment, employees and the self-employed, whether people work part-time or full-time, in permanent or temporary work. It reports on a large sample of the population and it is a comprehensive source of information on the labour force situation of everyone in the surveyed households who is economically active or inactive. It captures data on everyone who is or could be in the labour force. In particular, it gathers information about self-employed individuals whose economic activity is not included in the economic output data that is gathered for the quarterly analysis of GDP growth.

¹⁹ Bank of England (2014) *Inflation Report May 2014*, London, Bank of England; Barnett et al. (2014) *op. cit.* p118.

The basic sources for the quarterly growth figures are Monthly Business Surveys on Production & Services, Construction Output and Retail Sales. It is highly significant that the selection criteria for the inclusion of businesses in the survey samples are that they should be 'registered for VAT and/or PAYE'. That is, the small firms of the self-employed whose turnover does not meet the VAT threshold (£77,000 per annum) and who do not employ any other staff are excluded from the surveys. According to the Department of Business, Innovation and Skills (BIS), the majority of the 4.9 million private sector businesses in the UK were not registered for either VAT or PAYE at the start of 2013. There were around 2.74 million firms in the UK in 2013 that were unregistered and had no employees. These represented 56% of all UK firms.

In 2012, as the ONS proceeded to the second and third quarterly estimates, and expenditure and income data were included with updated output figures, some commentators expected this to result in a modification of the GDP data to bring them more in line with the experience of the employment statistics. This did not happen. There were only some minor modifications. The reason there were no major changes as further information was included, however, was that this new data are also based on the returns of organisations in the formal sector of the economy. The self-employed who are registered for neither VAT nor PAYE continued to be excluded. While we might expect a small correction, therefore, we should not expect a significant change in the growth figures. Indeed, the third estimate for a quarter is published around 13 weeks after the preliminary estimate and, although the amount of information contained in successive estimates increases from 44% in the first to over 90% in the third, the revisions typically result in only 0.1 or 0.2 percentage points adjustment in either direction (Walker et al. 2012). This is not what should be expected if the data on unregistered firms were included and if, as the Department of Business Innovation and Skills (BIS) estimate, unregistered firms account for 3% of all turnover in the UK.

There are two issues here. The first is that if the unregistered firm data were included in the quarterly figures, the reported *level* of the UK's GDP would have been higher over many years. The second is that, if the importance of unregistered firms in the

economy has been increasing in recent years, this would be reflected in a growing gap between reported and actual growth *rates*. GDP under-reporting will have increased over time, resulting in an increasing discrepancy between real and actual growth rates. If it is correct that the labour market changes have been significant for the way GDP is measured and therefore for the relationship between the UK's GDP and employment data, there will be an important outcome for the calculation of productivity in the UK.

The GDP methodology and its inability to take account of the changes in the labour market are significant reasons for the apparent discrepancy between the growth and employment data sets. For good historical reasons, most economists focus on employer-employee relations when discussing economic change, but underlying this is an assumption that the self-employed are an historical remnant that will disappear with economic growth. For policy-makers they are the future, but for macro-economic analysts they are residual.

We will look more closely at their growing importance in Section 3. The structure of self-employment is changing and it is clearly not the case that they are of declining relevance. The increase in certain types of self-employment is structural, rather than cyclical, and it is significant for the way the economy is measured.

Economists in the financial sector in particular have been quick to argue that, since there was no evidence of a double-dip recession in the employment statistics, there must be a problem of under-reporting in the GDP data. 'Businesses do not employ more people to do less work', so the economy must be doing better than the GDP statistics are telling us. The problem with this analysis is that it too ignores the significance of the self-employed.

This is a perspective that assumes that the issue is to be explained by reference to the rational behaviour of employers. It is a powerful assumption that is rooted in neo-classical economics and is at the heart of all other attempts to explain the productivity puzzle²⁰. The problem with the relationship between GDP data and

²⁰ See, for example, Barnett, et al. (2014) op. cit., pp. 116-117.

employment statistics, however, cannot be understood solely by reference to employers' behaviour. The employment changes we have referred to above are not dependent on the rational economic choices of businesses that employ workers. These economists are looking for an explanation in the wrong place, using a theoretical framework that is inadequate to deal with the changing nature of employment.

The main problem with the employment statistics is the way they are being interpreted. Economists have not been looking closely enough at what has been happening in the UK labour market and thinking about how this might influence the gathering of reliable statistics on production. The under-reporting of economic activity is not because of the activities of employers and employees. It is fundamentally about the changing nature and importance of self-employment and the exclusion of the most precarious of this type of activity from the quarterly data sources that are used.

The ONS argue that while the possibility of measurement error cannot be ruled out, the rigour and complexity of the ONS methodology means that substantial errors are unlikely. Historically, it has been the case that subsequent revisions of the quarterly GDP output figures tend to support the original estimates. They think that the revision of the GDP figures is unlikely to explain much of the gap between output and employment²¹. This may be true, but not for the reasons the ONS propose.

The ONS confront the argument of some commentators that GDP estimates do not match other business opinion surveys, such as the purchasing Managers Indices (PMI). They point out that while direct comparisons are not possible for a number of methodological reasons, by standardising both sets of data there is relative coherence across the major business sectors and the economy as a whole.

Similarly, against the suggestion that there is a discrepancy between tax revenue data and GDP statistics, with the GDP estimates understating the strength of the economy, the ONS urge caution in such comparisons because of differences in

²¹ Patterson, *op.cit.*, p.29.

accounting for inflation, changes in tax rates and allowances, the lag in collecting taxes, and the changes in the VAT rates after 2008. They point out, correctly, that it is difficult to draw conclusions about the relationship between VAT receipts and GDP. However, closer attention has to be paid to the relevance of the concept of these 'receipts' if a growing sector of the economy does not charge VAT for labour. The methodology currently excludes these workers/firms and they will not be included in further revisions of the quarterly statistics. VAT receipts will permanently understate their economic contribution and if treated uncritically will compound the original weaknesses in the GDP estimates.

The ONS also point out that 'the pattern of PAYE income tax receipts shows a fairly close relationship with nominal GDP growth'²². But of course the precariously self-employed do not have workers contributing through the PAYE system and some of their income may be cash in hand, particularly in the construction sector. The ONS also confirm that movements in national insurance contributions do not vary considerably from trends in GDP estimates either. However, NIC contributions are not gathered by larger contractors from subcontracted self-employed construction workers, one of the largest groups of the self-employed. Neither will they be paid immediately, if at all, by the part-time self-employed, particularly older workers who may have retired.

The official figures for PAYE and NIC will under-represent the economic activity of those working in part-time, temporary, insecure and precarious self-employment. In the best of cases, where all obligations to the state are eventually met, there will be time lag between receiving income and paying tax and insurance contributions. In most cases, VAT, PAYE and NIC data will suffer from the same methodological weaknesses as GDP output figures, which makes them unreliable as alternative measures to support the GDP figures. There is therefore a great deal of uncertainty about the contribution of an increasing segment of the labour force and business to both economic output and productivity.

²² Patterson, op.cit., p.31.

To identify the extent of the problem as it affects estimates of productivity in the UK, we will analyse statistical information from the different sources mentioned above. The small firm employment data that are used in the paper come mainly from the Labour Force Survey but this is brought together with information on small firms from the Business Population Estimates of the Department of Business, Innovation and Skills. The LFS data deals with part-time self-employment growth in recent years and the BIS data contributes additional information on unregistered small firms. We will look first at the growth of part-time self-employment in the LFS, then at the growth of unregistered businesses as estimated by the BIS. We will then investigate the way this small firm information relates to the growth statistics as presented in the quarterly GDP figures from the ONS, before creating a number of different scenarios to attempt an analysis of what this may mean for productivity in the UK.

3. The Growth of Precarious Part-time Self-employment

While the business surveys fail to capture information on the smallest firms, the LFS includes data on people who work for themselves outside the formal sector of the economy²³. The LFS data point to a growth in precarious self-employment in recent years. Precarious work is about job insecurity and it is characterised by underemployment, including people looking for more hours (in their current job or in new or additional employment), low levels of income, so-called 'flexible' employment contracts, temporary contracts, on-call shift working, zero hours contracts, loss of employment protection, a lack of health insurance and the long-term security of pension provision, and few opportunities for career advancement.

It affects all categories of the workforce in the UK - managers and professionals as well as the low skilled and, although it is normally discussed and analysed in relation to employees, it is a concept that is also relevant for the self-employed. The new

²³ Some of these workers will be involved in the black/grey sector of the economy, an area where no surveys can be relied on for accurate information. If the business surveys are exclusionary, household surveys can also fail to pick up information about those who are operating at the margins of the tax and benefit systems. People in this situation do not tell the truth. Respondents will certainly not be reporting on illegal activities. At this stage, however, under-reporting is not at the heart of the matter. It is of marginal importance compared to what *is* reported and what legal activities the quarterly GDP data fail to capture. The ONS make allowances for underreporting and tax evasion issues in their final figures for the 'Blue Book'.

self-employed are not the 'precariat' identified by Standing²⁴. They are not at the bottom of the social structure, situated somewhere below the stable manual employees of the working class. Some of them are people who have moved from the 'salarial' to precarious work. Since the financial crisis in particular, they may have left stable full-time employment in government and private corporations (with pensions, paid holidays and other benefits) to join an army of consultants and independent own-account professional and technical workers – who seek neither to re-enter full-time salaried employment nor to chase the great wealth that comes from building successful corporations. Many of them have retired from salaried employment, some are drawing a pension, they could be supported by a working partner and they may be working part-time, often on the internet, from a converted bedroom in a mortgage-free house.

The ONS use a more narrow definition of precariousness than the one proposed above. As a proxy, the measure that Palmer uses is whether workers are 'looking for a different or additional paid job or business'²⁵ - and the ONS correctly point out that there is little evidence that self-employment is being used as a stop-gap until more permanent employment is available. Evidence from the LFS shows that that only around 5% of the self-employed were looking for a different or additional job or business at the beginning of 2014²⁶. This, however, is not a valid test of the precariousness of work.

Whether part-time self-employment is precarious or not is not just determined by whether it is a substitute for unemployment. The self-employed will stick with their businesses through thick and thin, trying to make them work, until they fail to be viable – usually because they cannot pay the rent on their premises (or the mortgage on their home) or the bank closes them down.

²⁴ Standing, G. (2011) *The Precariat: The New Dangerous Class* (London, Bloomsbury).

²⁵ Palmer, N. (2014) Trends in Self-employment, Paper presented to ONS Economic Forum, 10 July 2014 (<http://www.ons.gov.uk/ons/about-ons/get-involved/events/events/economic-forum/july-2014/index.html>).

²⁶ Palmer, N. (2014) Trends in Self-employment, Paper presented to ONS Economic Forum, 10 July 2014 (<http://www.ons.gov.uk/ons/about-ons/get-involved/events/events/economic-forum/july-2014/index.html>).

The question that was used to provide this LFS information addresses only one aspect of underemployment: visible²⁷ or ‘time-related’ underemployment. Visible underemployment involves persons involuntarily working part-time or for shorter than usual periods of work. The ONS refer to this as ‘time-related underemployment’. More important, however, they only focus on two out of three elements of time-related underemployment. Time-related underemployment refers to workers who want to work more hours²⁸. It occurs where a worker wants to work more hours through: obtaining another job in addition to their current job, getting another job with more hours instead of their current job; or *increasing the number of hours worked in their current job*. This third element is missing from the ONS perspective on underemployment amongst the self-employed.

The question that provides the evidence for Palmer’s conclusion does not deal with this last issue: increasing the number of hours worked without changing job or obtaining an additional source of income. Historically it is the case that ‘the vast majority of employees wanting to work more hours preferred to do so in their current jobs’²⁹ and there is every reason to believe that the same would be true for even more of the self-employed³⁰. The real rate of time-related underemployment amongst the self-employed will therefore be much higher than Palmer suggests – and time-related underemployment is only one aspect of the precariousness of part-time self-employment.

It is difficult to ascertain precisely how important the self-employed are to the economy, particularly those working part-time. At the present time, we do not know if the changes that have taken place in the structure of employment and self-

²⁷ Invisible underemployment exists when a person’s working time is not abnormally reduced but whose employment is inadequate in other aspects, such as when the job does not permit full use of the person’s highest existing skill or capacity; when earnings from employment are abnormally low or; when a person is employed in an organisation whose productivity is abnormally low. Invisible underemployment is sometimes referred to as disguised underemployment or as potential unemployment. A modern example of invisible/disguised underemployment would be where graduates are employed flipping burgers, working in clothes shops or, if we compare graduate employment in the 1960s with today, working in administrative posts in universities and other areas of the public and private sectors.

²⁸ Anyone who works one hour or more in a week is classified as employed.

²⁹ Simic, M. (2002) Underemployment and overemployment in the UK, Labour Market Trends, August.

³⁰ To be classified as underemployed they also need to be available for additional work within two weeks and currently working under 40 hours per week if they are between 16 and 18 and under 48 hours if they are over 18.

employment are significant enough to contribute to the kind of disparity we have been seeing between the growth and employment data. Are the self-employed growing in number, are their fundamental characteristics being transformed and are the changes significant? We do not know precisely how many of the part-time self-employed are unregistered, since the information from BIS is patchy, but the growth of part-time self-employment can be used to estimate the increasing numbers of unregistered firms and their contribution to both growth and productivity. There is no doubt the increase in the numbers reporting that they are in *part-time self-employment* has been spectacular.

Although still a relatively small proportion of people in work, the numbers of self-employed are certainly growing. They still only account for around 15% of the working population but this is up from around 8% in the 1970s. However, if we focus on the recent changes that are taking place in employment and examine the shifting balance between employees and the self-employed, the recent growth of people working on their own account is highly significant.

In Annex 1, we can see that the growth of full-time and part-time self-employment since 1992 has created a structural change in the UK labour force. This change has accelerated recently, catalysed by the financial crash of 2008. Table 1 shows a 32.5% increase in self-employment between 1992 and 2014, adding over a million self-employed workers and, between July-September 2008 and July-September 2012 when the question of the productivity puzzle became a major issue in the UK, the self-employed increased by 394,000, while the number of employees fell by 284,000³¹. The growth in self-employment far outweighed the decline in waged and salaried labour. Between 2012 and 2014, as the economy began to recover, the self-employed increased by a further 330,000, bringing the additional number of self-employed since the recession began to 724,000, which is much more than the increase in employees over the same period.

³¹ The ONS reports a slightly lower figure of 367,000 self-employed by comparing the April-June quarters for the same years but it is still greater than the decline in the employee count. See Office for National Statistics (2013) 'Self-employed up 367,000 in four years, mostly since 2011', 6th February, ONS at www.ons.gov.uk.

Table 1 Growth in Employment (People) 1992-2014 September (Q3)										
										UK (thousands aged 16 and over), seasonally adjusted
All in employment			Full-time and part-time workers							
	Total	Employees	Self employed	Unpaid family workers	Total working full-time	Total working part-time	Employees working full-time	Employees working part-time	Self-employed working full-time	Self-employed working part-time
People										
Jul-Sep 1992	25,509	21,551	3,411	178	19,492	6,017	16,448	5,103	2,811	599
Jul-Sep 2008	29,386	25,391	3,796	92	21,904	7,482	18,958	6,434	2,897	899
Jul-Sep 2009	28,867	24,828	3,851	78	21,226	7,641	18,295	6,532	2,878	973
Jul-Sep 2010	29,173	24,920	4,016	106	21,186	7,987	18,163	6,757	2,965	1,051
Jul-Sep 2011	29,063	24,788	4,079	107	21,259	7,803	18,265	6,523	2,948	1,130
Jul-Sep 2012	29,576	25,107	4,191	112	21,456	8,120	18,373	6,735	2,987	1,204
Jul-Sep 2013	29,953	25,468	4,197	114	21,868	8,085	18,740	6,728	3,033	1,164
Jul-Sep 2014	30,793	26,027	4,520	123	22,523	8,270	19,203	6,824	3,250	1,271
1992-2014										
Change	5,283	4,476	1,110	-55	3,031	2,253	2,754	1,721	438	671
% Change	20.7	20.8	32.5	-31.1	15.5	37.4	16.7	33.7	15.6	112.0
2008-2012										
Change	190	-284	394	20	-448	638	-585	301	90	304
% Change	0.6	-1.1	10.4	21.9	-2.0	8.5	-3.1	4.7	3.1	33.8
2008-2014										
Change	1407	635	724	31	619	788	245	390	352	371
% Change	4.8	2.5	19.1	33.8	2.8	10.5	1.3	6.1	12.2	41.3
2010-2014										
Change	1619	1107	504	16	1337	282	1040	67	285	220
% Change	5.5	4.4	12.6	15.3	6.3	3.5	5.7	1.0	9.6	20.9
2012-2014										
Change	1,217	920	330	11	1,067	150	830	89	263	67
% Change	4.1	3.7	7.9	9.7	5.0	1.8	4.5	1.3	8.8	5.6

Source: Labour Force Survey

The growth of part-time self-employment has been even more spectacular. Historically, the self-employed have consistently worked longer hours than employees but the *growth of the part-time self-employed (PTSE) goes back over 20 years*, a long-term trend that has accelerated since 2008³². Since 1992, the number of part-time self-employed has more than doubled, showing a rate of growth that has been significantly greater than that of both the full-time self-employed and part-time employees. The number of part-time self-employed has grown by around 112%,

³² Middleton, A. (2012) Underemployment and the Part-time Entrepreneur, Governance Foundation, Birmingham, October. Available at: www.governancefoundation.org

leading to part-time workers accounting for 28% of the self-employed by September 2014, up from 18% in 1992. Part-time work is historically associated with women in the labour market but over two decades male part-time self-employment rose by 168% and for women the increase was 85% (See Annex 1).

The crucial period for the expansion of part-time self-employment was between September 2008 and September 2012. During this time (Table 1):

- The increase in the number of PTSE was 304,000.
- This was more than three times the number of full-time self-employed jobs added.
- The increase in the PTSE was greater than the increase in increase in part-time wage/salary earners.
- The additional numbers of new PTSE jobs was equivalent to 68% of all full-time jobs lost and 52% of full-time employee jobs lost.

The financial crisis acted as a catalyst for this structural change and, through to September 2012, further impetus appears to have been provided by the policies of austerity. After the crash, part-time self-employment rose by one third and the rate of increase was even greater after the general election in 2010. Comparing the July-September quarters of 2008 and 2012, 585,000 full-time employees left the labour force and 304,000 new part-time self-employed workers were added (Table 1). The proportion of workers in part-time employment became higher amongst the self-employed than amongst employees. Since 2010, the proportion of employees working part-time has decreased while the proportion of the self-employed working part-time has continued to increase (from 26% to 28%)

In 2013, the situation began to change again, but the figures for 2008-12 may point to a significant change in the economy and labour market. It is possible that the spike since 2008 could be temporary, but the long-term information suggests a historical change that has been further stimulated by the financial collapse. They imply an underlying growth of the un-enumerated and unregulated parts of the economy that may have peaks and troughs over time, but whose general direction is

upwards. If this is the case, it is highly significant for the way GDP figures are gathered and for the way productivity is calculated on a quarterly basis.

It has to be noted that between Q3 2012 and Q3 2013, there was a significant decline in part-time self-employment and an increase in both full-time employees and the self-employed (Table 1): The big decline in part-time working was amongst the part-time self-employed, but we cannot say with any certainty that the increase of 46,000 full-time self-employed was a result of a transfer from part-time to full-time self-employment. In some cases the part-time self-employed will have transferred to full-time employment as employees, some will have retired and others will have withdrawn from the labour force and ceased to be economically active³³. What happened in 2012-13, however, may only be a blip in the underlying trend, for in 2014, the number of self-employed working part-time reached an all-time high.

There is also some uncertainty about the continuity of these recent changes. Behind the long-term trends there is a great deal of short-term volatility. In Table 2 we can see, month by month and quarter by quarter, the change in the employment figures for the period between September 2012 and September 2013. Over the year, the part-time self-employed fell by 40,000, but in one month/quarter (between the December-February and January-March quarters), the part-time self-employment fell by 43,000. For most of the rest of the year the figures rose and fell, ending in Q3 (July-September) higher than in Q1 (January-March). Over the whole year, the part-time self-employed declined, but the numbers also rose in 6 out of 12 months. After losing 43,000 in one month, the numbers began to grow again. This growth continued through to Q3 2014.

We should also note that the decline in the part-time self-employment between February and March 2013 was greater than the increase in the numbers of all employees and in all full-time workers (40,000 and 31,000 respectively). The only way this number could have been absorbed into the labour force is if they transferred

³³ We should note the fact that only 7,000 part-time waged or salaried jobs declined as full-time waged or salaried employment increased by 361,000. This does not support the labour hoarding theory. There is no evidence in these figures to suggest that labour hoarding was of any great significance during the recession, for if all 7,000 part-time employees have moved to full-time work, they would only account for 2% of the additional full-time workers.

to full-time wage/salaried, part-time wage/salaried and full-time self-employment (which increased by 20,000, 20,000 and 16,000 respectively). It is also possible that large numbers withdrew from the labour force after Christmas 2012. Alternatively, of course, there may be a problem with the data.

Table 2 Monthly Changes in Employment, September 2012-September 2013

	Total	Employees	Self employed	Total working full-time	Total working part-time	Employees working full-time	Employees working part-time	Self-employed working full-time	Self-employed working part-time
Jul-Sep 2012	29,576	25,107	4,191	21,456	8,120	18,373	6,735	2,987	1,204
Aug-Oct 2012	29,601	25,118	4,200	21,482	8,119	18,376	6,743	3,010	1,191
Sep-Nov 2012	29,700	25,218	4,205	21,589	8,111	18,481	6,737	3,017	1,189
Oct-Dec 2012	29,751	25,258	4,218	21,669	8,081	18,553	6,705	3,023	1,195
Nov-Jan 2013	29,732	25,288	4,179	21,677	8,055	18,585	6,704	2,993	1,186
Dec-Feb 2013	29,698	25,240	4,204	21,649	8,049	18,545	6,695	3,006	1,198
Jan-Mar 2013	29,708	25,280	4,176	21,680	8,028	18,565	6,715	3,022	1,155
Feb-Apr 2013	29,756	25,294	4,200	21,692	8,064	18,581	6,713	3,025	1,175
Mar-May 2013	29,714	25,275	4,176	21,677	8,038	18,583	6,692	3,017	1,159
Apr-Jun 2013	29,777	25,320	4,182	21,711	8,066	18,616	6,704	3,011	1,171
May-Jul 2013	29,836	25,392	4,173	21,787	8,049	18,685	6,708	3,013	1,160
Jun-Aug 2013	29,869	25,376	4,209	21,824	8,045	18,684	6,693	3,047	1,162
Jul-Sep 2013	29,953	25,468	4,197	21,868	8,085	18,740	6,728	3,033	1,164

Despite the uncertainty around the future of part-time self-employment, it will be assumed that the labour market figures for Q3 are accurate and that the accelerated growth between 2008 and 2012 was the result of the financial crash and subsequent policies of austerity. Given the historic trends since 1992, it is likely that the rate of increase in part-time self-employment may stabilise or decline and then head upwards in the future. More important for the current analysis, however, is how these historic trends are related to the growth of unregistered small firms, which has implications for the measurement of the UK's quarterly GDP growth and related levels of productivity.

4. The Growing Numbers of Unregistered Self-employed Firms

The extent of the data problem at the level of the firm can be deduced from the statistics for small firms prepared by the Department of Business Innovation and Skills (BIS). The Business Population Estimates of BIS use a wider range of sources than the ONS and they include estimates of the numbers of small firms that are not registered for VAT and/or PAYE³⁴. The BIS uses the Inter-Departmental Business Record (IDBR) and the ONS Labour Force Survey (LFS). The IDBR includes only those firms that are registered for VAT and/or PAYE, whereas the LFS includes unregistered self-employed individuals. To get the number of unregistered small firms, they subtract the total of registered self-employed in the IDBR from the number of self-employed reported in the LFS, taking care to avoid double counting. They then use the HMRC's Survey of Personal Incomes (SPI) to estimate the proportion of unregistered self-employed people working either alone or as a partner.

According to time series data from BIS, the number of firms with no employees has been rising dramatically. It is estimated that in 2000 around 68% of UK private sector firms had no employees but by the start of 2013 this had risen to 75%, an increase of 1,326,615 firms (or 56%) (Table 3). Over the same period, between 2000 and 2013, the number of **unregistered** businesses employing no one other than the owners or partners increased by 1,240,145, a growth of 83%. In 13 years, unregistered firms with no employees increased from 43% of all UK firms to 56% and by the end of this period, according to these figures, there were 2.74 million firms in the UK that were unregistered and had no employees. In these firms there were 2,980,000 working proprietors (self-employed or partners) who employed no one other than themselves (Table 4). That is, there are almost three million workers in the UK whose output makes no contribution to the quarterly estimates of GDP.

Table 3

Number of businesses in the UK private sector, registered and unregistered

³⁴ Shaw, J. (2011) Business Population Estimates for the UK and Regions, *Economic and Labour Market Review*, April; Department for Business Innovation and Skills (2010) Small and Medium-sized Enterprise (SME) Statistics for the UK and the Regions, 2009: Methodology Note, London, BIS

	2000		2013		Increase 2000-2013	
	Number	%	Number	%	Number	%
All businesses	3468705	100	4895655	100	1426950	41.1
With employees (registered)	1110575	32.1	1210910	24.7	100335	9.0
With no employees (unregistered)	1499845	43.2	2739990	56.0	1240145	82.7
With no employees (registered)	858285	24.7	944755	19.3	86470	10.1
Total with no employees	2358130	67.9	3684745	75.3	1326615	56.3

Source: BIS, Business Population Estimates for the UK and Regions, 2013, London, BIS, Table 24.

At the beginning of 2013, 4,053,000 UK businesses (82.8%) were run by ‘working proprietors’. In these firms, 2,980,000 working proprietors were not registered for VAT, were not part of a PAYE scheme and would not be included in the business surveys that are used to compile the growth figures³⁵. These 2.98 million workers also account for around 71% of those who report that they are self-employed in the LFS. As a consequence, we can say that 71% of the self-employed, who are working in 56% of firms, are included in the labour input part of the equation that calculates productivity in the UK every quarter, but excluded from the output part. These figures will be important when we come to discuss the creation of the different scenarios for estimating productivity in the UK. First, however, we will consider in more detail how data on the self-employed are introduced into the calculations on GDP.

³⁵ A further 1,054,000 proprietors were working in almost a million firms that were registered but had no employees.

Table 4

Number of businesses in the private sector and their associated employment, by number of employees, UK, start 2013

	Number				Turnover £ millions	% of all turnover
	Businesses	Employment <i>thousands</i>	Employees <i>thousands</i>	Working Proprietors ² <i>thousands</i>		
All businesses	4,895,655	24,332	20,279	4,053	3,279,961	100
All employers	1,210,910	20,298	19,678	620	3,071,334	94
With no employees (unregistered) ²	2,739,990	2,980	0	2,980	91,116	3
With no employees (registered) ¹	944,755	1,054	600	453	117,511	4
1	162,465	367	162	205	26,909	1
2-4	594,655	1,782	1,558	224	184,531	6
5-9	229,765	1,580	1,494	86	176,215	5
10-19	121,530	1,683	1,638	45	200,713	6
20-49	65,215	1,981	1,949	32	289,285	9
50-99	20,180	1,392	1,385	8	217,660	7
100-199	8,760	1,216	1,211	5	206,258	6
200-249	1,745	389	388	2	67,364	2
250-499	3,415	1,185	1,181	4	220,566	7
500 or more	3,180	8,722	8,713	9	1,481,833	45

Source: Business Population Estimates for the UK and Regions 2013, Table 1, UK Private Sector, Department for Business Education and Skills, London.

Notes:

1. Businesses with no employees can either be 'registered' for either VAT and/or PAYE or are 'unregistered' (because they operate in a VAT exempt industry or they operate below the VAT threshold and do not operate a pay-as-you-earn scheme).
2. "Working Proprietors" can be distinguished from employees here by being defined as owners(s) of the business and not working under a contract of employment in return for a wage or a salary. Numbers of businesses are rounded, in order to avoid disclosure. Consequently, the "All businesses" and "All employers" totals may not exactly match the sum of their parts.

5. GDP and the Inclusion of Income Data

The only way to judge the impact of the increase in self-employment in the GDP growth figures is to look at the income measure of growth and the indicator that is based on the HMRC income tax returns (Table 5). Unfortunately, as already pointed out, these are not introduced until the final stage of estimating annual growth. The

data used for the Income Measure is the income earned by individuals and corporations in the production of goods and services, a formula which includes compensation of employees, plus gross mixed income, plus gross operating surplus, plus taxes on production and imports, minus subsidies on production (Walker et al., 2012)³⁶. In this formula, 'mixed income' is mainly the income of the self-employed (Lee, 2012)³⁷. The term 'mixed income' covers the generation of income by unincorporated firms, owned by members of households, in which the owner may work without receiving a wage or salary. The two main components of mixed income are self-employment income (sole traders) and rental income.

Table 5

Sources Used in Compiling Estimates of GDP Income Approach

Quarterly balances:	GDP Component	Organisation
	Gross Operating Surplus of Private Non-financial Corporations	ONS Quarterly Profits Inquiry, forecasts
	Gross Operating Surplus of Private Financial Corporations	Bank of England
	Compensation of Employees	ONS Average Weekly Earnings ONS Workforce Jobs

Main Annual Sources for Supply and Use Balancing

Her Majesty's Revenue and Custom income data
Bank of England
ONS Quarterly Profits Inquiry
ONS Public Corporations Survey
Her Majesty's Treasury data

Source: Walker, G., Walton, A. and Georghiadis, T. (2012) Why is GDP revised? London, Office for National Statistics.

For the quarterly estimates, one might expect the ONS Average Weekly Earnings to include the income of the self-employed but, as the Resolution Foundation has

³⁶ Walker, G., Walton, A. and Georghiadis, T. (2012) Why is GDP revised? London, Office for National Statistics.

³⁷ Lee, P. (2012) Balancing the Three Approaches to Measuring Gross Domestic Product, London, Office for National Statistics.

pointed out, this is not the case³⁸. The government figures on average weekly incomes do not include the income of the self-employed. The Resolution Foundation have also pointed out that, as a result, these official figures may understate the size in the fall in incomes since 2008 by as much as 30%. The inclusion of these weekly earnings data in the calculation of the quarterly statistics on GDP understate the overall decline in earnings since the recession began. It also reinforces the error created by excluding the majority of the self-employed from the production figures and helps to explain why there is no discrepancy with earlier GDP estimates when this income data is included. By virtue of excluding the self-employed, the income data that are used in what are assumed to be improved quarterly estimates of GDP actually contribute to the problem, by strengthening the view that there is a productivity conundrum.

Since the income of the self-employed is not introduced until after they report their income annually to HMRC, the information cannot be included until the Revenue have processed the data. There are no survey sources for sole traders' or rental income and there are understandable reasons this. There is the technical difficulty of obtaining a reliable sampling frame for unregistered firms, along with the reliability of responses and the burden that such surveys would put on small firms. The owners of some small firms, particularly in retail where goods are often bought from cash and carry warehouses and partially consumed by the household, also find it difficult to distinguish between capital investment and consumption goods. Information on mixed income is therefore mainly taken from the HMRC tax records, although it is enhanced with a small amount of information from other sources.

A further difficulty that has to be accounted for is the under-reporting of income by the self-employed. Adjustments, which are made to bring the HMRC and other data into line with the requirements of national accounting, make up 31% of all income attributed to sole traders. The value of concealed employment income not declared through tax returns is assessed to be 26% of all sole trader income for national accounting purposes.

³⁸ Gardiner, L. (2014) *All Accounted For: the case for an 'all worker' earnings measure*, London, Resolution Foundation.

In 2005, the self-employed accounted for around 85% of all mixed income and HMRC data accounted for around 85% of the information on the self-employed, before adjustments for matters such as tax evasion. The aggregated HMRC self-assessment data for the self-employed are split into SIC industrial sectors. Rental Income includes returns in the growing but unincorporated buy-to-let sector, as well as adjustments for legal but unreported rent-a-room income and tax evasion³⁹.

Given that there almost 3 million self-employed who are not included in the output figures, we should expect a substantial increase in the revised (quarterly) GDP figures after the Supply and Use Tables (SUTs) are produced for any year. These unregistered working proprietors, however, only account for 12% of employment in the UK and, according to BIS information, which depends on the self-employed reporting their income honestly, unregistered working proprietors with no employees account for only 3% of national turnover (Table 4).

There is no evidence of a rise of this size being reflected in the quarterly estimates of GDP as we progress from the first to the third estimates and there is no indication of such a rise when the HMRC data on mixed income are incorporated into the annual accounts. This points to a significant error in the measurement of the level of GDP. The growth in unregistered firms that we have noted, however, also suggests that there will also be an error in the calculation of the growth of GDP over time. SUTs are produced for 110 industries and products, based on the 2007 Standard Industrial Classification (SIC). These incorporate the components of the three approaches to measuring GDP. Balancing SUTs is an annual exercise using a further set of annual sources of data. Walker et al. say 'there is no additional information about the quarterly movements in GDP that comes from producing the SUTs' but they go on to say that 'there can be revisions to the quarterly path arising from annual revisions'. If there is an increase in the unregistered self-employed, we should expect a growing discrepancy between the quarterly data and the annual revisions. However, if this is not corrected as expected, it implies that the value of production and services that is understated may be growing over time.

³⁹ Under the rent-a-room scheme homeowners are allowed to rent out a room without being assessed for tax up to a certain monetary limit. An adjustment is also made for earnings on foreign-owned private property in the UK by transferring the value to the non-financial corporation sector.

There was indeed a problem in reconciling the quarterly and annual data in 2008 and 2009, 'where the SUTs suggested that the 2008 level of GDP was lower than previously thought but that 2009 was higher'⁴⁰:

Blue Book 2011 had a steeper, deeper fall through 2008 followed by a flattening out in the early part of 2009 and then, a stronger recovery in the second half of 2009 and early 2010.

The problem here may be a reflection of trends in unregistered self-employment and difficulties in accommodating these changes in the collection of output data.

We have seen that the amount of information used in the quarterly growth estimates increases from around 44% in the first estimate to over 90% in the third estimate, and that this does not lead to significant revisions in GDP estimates. Over longer timescales, however, we should expect that the income measure will be affected. As Walker points out: 'The short-term income measure is the weakest and receives little or no weight until the benchmarks are received from HMRC'⁴¹. This should then produce further significant quarterly revisions. None of these revisions, however, compensate for the scale of the initial under-measurement if the BIS assessment of unregulated turnover is accurate.

With the rapid growth in the unregistered self-employed, who are excluded from the quarterly GDP revisions but will appear in the final annual tables, this should lead to revisions upwards that are greater than the historical average. Walker et al. confirm that 'the size of the revisions have been larger since 2006 than in previous periods', that 'subsequent revisions over the period since 2008 have been a little larger than have been experienced during the 10 years of relatively stable growth'⁴².

It is thought that these changes can be explained in part by the methodological changes introduced in 2011, when there was a change in the deflator, moving from

⁴⁰ Walker et al., *op. cit.*, n.p.

⁴¹ Walker et al., *op. cit.*, n.p.

⁴² Walker et al., *op. cit.*, n.p.

the use of the Retail Prices Index (RPI) to the Consumer Price Index (CPI), which added 0.2 percentage points to average annual growth and added 0.3 percentage points in 2009. This leads Walker et al. to suggest that this could imply that the assumptions and methods for the early estimates that worked well in the period of stable growth may not be relevant in periods of economic volatility. It is recognised, therefore, that some assumptions made in compiling GDP may no longer hold. However, the problem is not so much the assumptions that are made but the practicalities of obtaining data on the self-employed that can be incorporated into the quarterly GDP data. As we have noted, the revisions of the preliminary estimates of GDP, through to the third estimate, are small and information about the self-employed are not included in these stages. The absence of this data then has a significant impact on the analysis of UK productivity, the discussion of which is based on the quarterly data - which, it has been assumed, will not vary greatly as new information is included when the data are progressively revised.

If we make different assumptions about the impact of the growth of self-employment on the UK economy and, recognising the difficulty of obtaining data on the contribution of the self-employed to output, we make different assumptions about the structure of the economy using BIS and ONS data on firms and workers, we can hypothesise about the possible changing relationship between output and employment, and therefore productivity. It is therefore appropriate to look at what would happen if the unregistered self-employed were removed from the quarterly productivity calculations. In the absence of reliable and precise data on the growth of unregistered self-employment, this involves setting out a number of scenarios, using a variety of assumptions about the relationship between the self-employed, as self-reported in the Labour Force Survey and used in the calculation of productivity, and the self-employed who are not registered for either VAT or PAYE.

6. Productivity and the Newly Self-employed

In this section we will attempt to *estimate the effect of the recent expansion of the self-employed on productivity in the UK*. To carry out the analysis, we will use the data that are available over the period Q1 2008 to Q4 2013. In analysing this data, we will use three different assumptions about the level of registration for VAT and PAYE amongst the self-employed. It is recognised that the validity of each of these assumptions can be disputed and, over time as more evidence becomes available, we would expect them to be rejected and/or modified. The assumptions are concerned with the inclusion or exclusion of different proportions of the self-employed when calculating quarterly GDP and productivity estimates in the UK. It is also recognised that the outcome of the exercise will be relevant for international comparisons of GDP and, since the information under discussion may also be relevant for UK Eurostat reporting, the results may raise issues for the calculation of national contributions to the EU budget. These considerations are, however, outside the scope of this paper⁴³.

The three assumptions, based on the discussions above, are that:

1. All part-time self-employed workers should be excluded from the quarterly calculations of productivity on the grounds that they are unlikely to be registered for either VAT or PAYE.
2. Around 71% of all self-employed workers should be excluded because this percentage of the people who report themselves as self-employed in the LFS will not be registered.
3. The numbers of workers to be excluded will be 71% in 2013 but historic growth in the numbers of unregistered firms will have been similar to the growth pattern for the part-time self-employed.

Assumption 3 is our preferred scenario, for it takes into account both the historical development of the productivity puzzle through the financial crisis and the recent history of the growth of part-time self-employment.

In Table 6, we can see the extent of the problem. This table shows the indices of GDP, employment and hours worked, based on the situation for each measure at the

⁴³ Eurostat (2013) *European System of Accounts ESA 2010*, Publications Office of the European Union, Luxembourg.

start of 2008. With Q1 2008 as the base quarter, by the end of Q4 2012, GDP was 4.8 points behind the index of employment and 3.8 points behind the index of hours worked. The remainder of this paper will be focusing on the relationship between output and employment, rather than hours worked. The ONS preferred measure of labour input in the calculation of productivity is hours worked. The principle that we will set out here can be easily adapted and applied in practice to the number of hours worked, rather than the number of jobs. The impact of our assumptions on productivity per hour could therefore be analysed with the same models using hours rather than jobs.

6.1 Assumption 1: All Part-time Self-employed Workers Excluded

In Table 7, we can see the effect of removing the part-time self-employed (PTSE) from the quarterly calculations on productivity. In this table the PTSE are used as a proxy for the unregistered self-employed who appear in the employment figures but whose output is not included in the quarterly production figures. Not all part-time self-employed workers will be unregistered for VAT purposes. However, the total number of PTSE is less than half of the number of unregistered small firms and we should expect that the vast majority of the PTSE will be unregistered. Table 7 also prepares the way for the analysis of Tables 9, 10 and 11.

The impact of including the PTSE in the productivity calculations depends on the timescale under investigation. Using different start and finishing dates produces quite different outcomes from the analysis. The effect of choosing Q4 2008 as the starting point for the analysis, rather than Q1 2008 for example, is remarkable.

Table 6

Index of output, employment and hours since Q1 2008, seasonally adjusted, Q1 2008 = 100

	<i>Index, Q1 2008 =100</i>		
	GDP, CVM	Employment, Aged 16 +	Total weekly hours, Aged 16 +
	<i>ABMI</i>	<i>MGRZ</i>	<i>YBUS</i>
2008			
Q1	100.0	100.0	100.0
Q2	99.1	100.1	98.9
Q3	97.7	99.6	98.9
Q4	95.6	99.4	98.3
2009			
Q1	93.2	98.9	96.7
Q2	92.8	97.9	96.3
Q3	92.8	97.8	95.8
Q4	93.2	97.9	95.8
2010			
Q1	93.7	97.6	95.7
Q2	94.7	98.2	96.5
Q3	95.0	98.9	97.0
Q4	94.8	98.7	97.4
2011			
Q1	95.3	99.0	97.4
Q2	95.4	99.0	96.3
Q3	95.9	98.5	97.1
Q4	95.8	98.8	97.3
2012			
Q1	95.8	99.2	98.0
Q2	95.4	99.9	98.5
Q3	96.2	100.2	99.6
Q4	96.0	100.8	99.8
2013			
Q1	96.5	100.7	100.1
Q2	97.3	100.9	100.4
Q2	98.0	101.5	101.4
Q4	98.7	102.2	101.8

Source: ONS

In Table 7, the following issues stand out:

1. In 1997, removing this segment of the workforce from the way productivity is measured would have increased productivity by 2.8%. By 2012 and 2013, as the PTSE have increased in importance, their removal would increase productivity by 4.2%. The size of the increase in productivity that is gained by excluding the PTSE, therefore, has been increasing over a long period of time.
2. If the starting point for the analysis is just before the crash, through to the end of 2012, we find that between Q1:08 and Q4:12, unadjusted productivity per worker declined by 4.7% but if we remove the PTSE, it only fell by 3.9%. At first glance, it appears to be the case that including/excluding the PTSE influences the level of productivity by less than 1%.
3. However, if the starting point for the analysis is later in 2008 and if we look at the four main years of the recession between Q4:08 and Q4:12, productivity declined by 0.9%. If we remove the PTSE there was no fall in productivity.
4. In the 2 years between Q4:10 and Q4:12, the key years for the emergence of the productivity conundrum, GDP grew by 1.3% while employment grew by 2.2%. If we remove the PTSE, the remainder of the labour force grew by 1.8% and the fall in productivity almost halved (from -0.9% to -0.5%).
5. If we extend the period under scrutiny through 2013, when there were four quarters of positive GDP growth (Table 6), we find that between Q4:10 and Q4:13, GDP grew faster than the labour force (4.0% against 3.5%). If we discount the PTSE, whose numbers increased by 14.4% during this period, the rest of the labour force only grew by 3.1%. Productivity per worker increased throughout 2013 but growth in productivity without the PTSE was twice the growth when the PTSE are included.

6.2 Assumption 2: 71% of the self-employed should be excluded

We have calculated that 71% of those who report themselves as self-employed in the Labour Force Survey are unregistered for VAT and PAYE. If we replaces all the

PTSE with 71% of the self-employed and carry out a similar analysis to that found in Table 7, we can see the result in Table 8. It has to be stressed that we do not know what percentage of the self-employed were unregistered in 1997 and, because of recent changes in measurement, there is considerable uncertainty about the information that is available for the period of the recent recession. Given the growth trends we have seen for the PTSE in recent times, we might expect the unregistered self-employed also to have grown in importance and we will return to this issue in the analysis under the third assumption, below. For the purposes of Table 8, however, we will assume that 71% of the self-employed have been unregistered since 1997 and that they have therefore been included in the employment data but excluded from the business surveys and other sources used to produce the quarterly GDP data over this period of time.

The number of workers who are included in the 71% of the self-employed is greater than the number of PTSE. From 1997 to 2013, the effect of removing 71% of the self-employed from the quarterly calculations of productivity is therefore greater than removing all the PTSE. Discounting 71% of the self-employed would result in an increase in recorded productivity of between 10.1% and 11.5% in any quarter. As would be expected by removing more of the self-employed, the increase in productivity in Table 8 is greater than in Table 7. UK productivity in Q4 2013, for example, would be 11.5% higher, rather than 4.2% higher.

The pattern of growth and decline in productivity remains roughly similar. However, in the period of greatest interest for the productivity puzzle (Q4 2010 to Q4 2012), when GDP grew by 1.3% and total employment grew by 2.2%, removing the unregistered workers meant the remainder of the labour force grew by only 1.7% and the fall in productivity almost halved (from -0.9% to -0.5%).

Table 7 Productivity & Part-time Self-employment 1997-2013								
	GDP at market prices (000,000)	Total Workers (000)	Productivity per worker [a/b]	Part-time Self-employed (PTSE)	Total Workers less PTSE (000)	Productivity excluding PTSE [a/e]	Productivity Increase (f-c)	% Increase in Productivity (g/c*100)
	a	b	c	d	e	f	g	h
1997 Q1	279 315	26,381	10588	717	25,664	10883	296	2.79
2008 Q1	392 786	29,510	13310	928	28,583	13742	432	3.25
2008 Q2	389 239	29,536	13179	908	28,628	13597	418	3.17
2008 Q3	383 626	29,386	13055	899	28,487	13467	412	3.16
2008 Q4	375 388	29,329	12799	925	28,403	13216	417	3.26
2009 Q1	366 124	29,172	12550	922	28,250	12960	410	3.26
2009 Q2	364 573	28,900	12615	971	27,930	13053	438	3.48
2009 Q3	364 557	28,867	12629	973	27,893	13070	441	3.49
2009 Q4	366 107	28,901	12667	989	27,912	13116	449	3.54
2010 Q1	368 033	28,807	12776	1,007	27,800	13239	463	3.62
2010 Q2	371 779	28,975	12831	1,015	27,959	13297	466	3.63
2010 Q3	373 275	29,173	12795	1,051	28,122	13273	478	3.74
2010 Q4	372 529	29,120	12793	1,062	28,058	13277	484	3.79
2011 Q1	374 264	29,229	12804	1,090	28,139	13301	496	3.88
2011 Q2	374 628	29,224	12819	1,093	28,132	13317	498	3.88
2011 Q3	376 862	29,063	12967	1,130	27,932	13492	525	4.05
2011 Q4	376 462	29,146	12917	1,113	28,032	13430	513	3.97
2012 Q1	376 324	29,274	12855	1,182	28,092	13396	541	4.21
2012 Q2	374 754	29,476	12714	1,182	28,293	13245	531	4.18
2012 Q3	377 684	29,576	12770	1,204	28,372	13312	542	4.24
2012 Q4	377 231	29,751	12680	1,195	28,556	13210	530	4.18
2013 Q1	378 759	29,708	12749	1,155	28,554	13265	515	4.04
2013 Q2	381 527	29,777	12813	1,171	28,606	13337	524	4.09
2013 Q3	384 686	29,953	12843	1,164	28,790	13362	519	4.04
2013 Q4	387 459	30,146	12853	1,215	28,932	13392	540	4.20
Increases								
Q1:08-Q4:13	-5327	636321	-458	287070	349251	-350	108	
%	-1.4	2.2	-3.4	30.9	1.2	-2.5	24.9	
Q1:08-Q4:12	-15555	240774	-631	267108	-26334	-532	99	
%	-4.0	0.8	-4.7	28.8	-0.1	-3.9	22.8	
Q4:08-Q4:12	1 843	422 282	- 120	269 409	152 873	- 6	114	
%	0.5	1.4	-0.9	29.1	0.5	0.0	27.2	
Q4:10-Q4:12	4702	630420	-113	132506	497913	-67	46	
%	1.3	2.2	-0.9	12.5	1.8	-0.5	9.5	
Q4:10-Q4:13	14930	1025967	60	152469	873498	115	55	
%	4.0	3.5	0.5	14.4	3.1	0.9	11.4	
Sources:								

ONS Statistical Bulletin: 2nd Estimate of GDP, Q3 2013, 26 Feb 2014, Table A2: National Accounts aggregates

ONS A01 Labour market statistics summary data tables, Table A01 - Sheet 3, March 2014, Seasonally adjusted

Table 8 Productivity, Discounting 71% Self-employment 1997-2013									
	GDP at market prices (000,000)	Total Workers (000)	Productivity per worker [a/b]	Self-employed (SE) (000)	71% Self-employed (71SE) (000)	Total Workers less 71% SE (000)	Productivity excluding 71% SE [a/f]	Productivity Increase (g-c)	% Increase in Productivity (h/c*100)
	a	b	c	d	e	f	g	h	i
1997 Q1	279 315	26,381	10588	3,481	2,472	23,909	11682	1095	10.3
2008 Q1	392 786	29,510	13310	3,858	2,739	26,771	14672	1362	10.2
2008 Q2	389 239	29,536	13179	3,835	2,723	26,813	14517	1338	10.2
2008 Q3	383 626	29,386	13055	3,796	2,695	26,691	14373	1318	10.1
2008 Q4	375 388	29,329	12799	3,803	2,700	26,628	14097	1298	10.1
2009 Q1	366 124	29,172	12550	3,821	2,713	26,460	13837	1287	10.3
2009 Q2	364 573	28,900	12615	3,817	2,710	26,190	13920	1305	10.3
2009 Q3	364 557	28,867	12629	3,851	2,734	26,132	13950	1321	10.5
2009 Q4	366 107	28,901	12667	3,882	2,756	26,145	14003	1335	10.5
2010 Q1	368 033	28,807	12776	3,927	2,788	26,019	14145	1369	10.7
2010 Q2	371 779	28,975	12831	3,924	2,786	26,189	14196	1365	10.6
2010 Q3	373 275	29,173	12795	4,016	2,851	26,322	14181	1386	10.8
2010 Q4	372 529	29,120	12793	3,976	2,823	26,298	14166	1373	10.7
2011 Q1	374 264	29,229	12804	3,960	2,812	26,417	14167	1363	10.6
2011 Q2	374 628	29,224	12819	3,984	2,828	26,396	14193	1374	10.7
2011 Q3	376 862	29,063	12967	4,079	2,896	26,167	14402	1435	11.1
2011 Q4	376 462	29,146	12917	4,075	2,894	26,252	14340	1424	11.0
2012 Q1	376 324	29,274	12855	4,163	2,956	26,319	14299	1444	11.2
2012 Q2	374 754	29,476	12714	4,202	2,983	26,492	14146	1432	11.3
2012 Q3	377 684	29,576	12770	4,191	2,975	26,601	14198	1428	11.2
2012 Q4	377 231	29,751	12680	4,218	2,995	26,756	14099	1419	11.2
2013 Q1	378 759	29,708	12749	4,176	2,965	26,743	14163	1414	11.1
2013 Q2	381 527	29,777	12813	4,182	2,969	26,808	14232	1419	11.1
2013 Q3	384 686	29,953	12843	4,197	2,980	26,974	14261	1419	11.0
2013 Q4	387 459	30,146	12853	4,368	3,102	27,045	14327	1474	11.5
Increases									
Q1:08-Q4:13	-5327	636321	-458	510533	362478	273843	-346	112	
%	-1.4	2.2	-3.4	13.2	13.2	1.0	-2.4	8.2	
Q1:08-Q4:12	-15555	240774	-631	360250	255777	-15003	-573	57	
%	-4.0	0.8	-4.7	9.3	9.3	-0.1	-3.9	4.2	
Q4:08-Q4:12	1843	422 282	- 120	415 185	294 781	127 501	2	121	
%	0.5	1.4	-0.9	10.9	10.9	0.5	0.0	9.4	
Q4:10-Q4:12	4702	630420	-113	242495	172171	458248	-67	46	
%	1.3	2.2	-0.9	6.1	6.1	1.7	-0.5	3.4	
Q4:10-Q4:13	14930	1025967	60	392778	278873	747094	161	101	
%	4.0	3.5	0.5	9.9	9.9	2.8	1.1	7.3	
Sources:									
ONS Statistical Bulletin: 2nd Estimate of GDP, Q3 2013, 26 Feb 2014, Table A2: National Accounts aggregates									
ONS A01 Labour market statistics summary data tables, Table A01 - Sheet 3, March 2014, Seasonally adjusted									

6.3 Assumption 3: 71% Self-employed Excluded, Following the Growth Pattern of PTSE

We saw in Table 4 that at the beginning of 2013 there were 2.74 million unregistered firms in which 2.98 million workers had found employment. At this time, according to the Labour Force Survey, there were around 4.19 million self-employed workers. That means that 71% of the self-employed were not registered for VAT or PAYE and, therefore, their output was not included in the quarterly GDP figures. In Table 8, we assumed that this proportion had not changed over time.

In Table 9, in the absence of reliable historical data, we have assumed that the proportion of the unregistered self-employed has increased over time, following the same pattern of growth as was found for the part-time self-employed. In Q1 2013, it was calculated that 2,965,010 unregistered self-employed, who accounted for 71% of the self-employed, made no contribution to the quarterly growth data but were included in the labour force part of the productivity equation. Using the growth of the part-time self-employed as a proxy for the growth of unregistered self-employed workers, the estimated number of unregistered workers in each quarter between Q4 2007 and Q4 2013 is contained in column g. By excluding these workers from the productivity calculations, the adjusted productivity data can be seen in column h and the increase in productivity that results from their exclusion can be seen in column i. With some minor fluctuations, the trend is for the value of the resulting increase in productivity to rise over time. As we move through the key period of the recession (Q3 2008 to Q3 2012) the increase in productivity gets larger. For each quarter, the percentage increase in productivity that results from this exercise can be seen in column j. This shows that from the end of 2007, the percentage productivity gain that is achieved by excluding the unregistered self-employed varies between 8.5% and 11.7%. That is, from the lowest to the highest increase in productivity there is a difference of 3.2 percentage points. From Q3 2008 through to Q3 2012, key quarters for the discussion of the productivity puzzle, the increase in productivity resulting from exclusion of the 71% of the self-employed who are not registered for VAT or PAYE is also 3.2 percentage points.

Table 9 UK Productivity Excluding Unregistered Self-employed Workers (1)											
	GDP at market prices (000,000)	Total Workers (000)	Productivity per worker [a/b]	Total Self-employed	Part-time Self-employed (PTSE) (000)	Growth of PTSE	Number Unregistered following PTSE growth (2)	Productivity excluding unregistered (a/(b-g))	Productivity increase by excluding unregistered (h-c)	% increase in productivity (i/c*100)	Percentage points change since Q3 2008
	a	b	c	d	e	f	g	h	i	j	k
2007 Q4	372340	29,408	12661	3815664	931		2391910	13782	1121	8.9	0.4
2008 Q1	392 786	29,510	13310	3857872	928	-0.41	2382171	14479	1169	8.8	0.3
2008 Q2	389 239	29,536	13179	3835236	908	-2.11	2332009	14308	1130	8.6	0.1
2008 Q3	383 626	29,386	13055	3796295	899	-0.97	2309335	14168	1113	8.5	0.0
2008 Q4	375 388	29,329	12799	3802937	925	2.90	2376260	13928	1128	8.8	0.3
2009 Q1	366 124	29,172	12550	3820716	922	-0.31	2368812	13660	1109	8.8	0.3
2009 Q2	364 573	28,900	12615	3817315	971	5.24	2492925	13806	1191	9.4	0.9
2009 Q3	364 557	28,867	12629	3850933	973	0.27	2499685	13826	1197	9.5	1.0
2009 Q4	366 107	28,901	12667	3881500	989	1.62	2540239	13888	1221	9.6	1.1
2010 Q1	368 033	28,807	12776	3927256	1,007	1.84	2587013	14036	1260	9.9	1.4
2010 Q2	371 779	28,975	12831	3923724	1,015	0.80	2607813	14100	1269	9.9	1.4
2010 Q3	373 275	29,173	12795	4015936	1,051	3.51	2699329	14100	1305	10.2	1.7
2010 Q4	372 529	29,120	12793	3975626	1,062	1.06	2727859	14115	1322	10.3	1.8
2011 Q1	374 264	29,229	12804	3960428	1,090	2.67	2800584	14161	1357	10.6	2.1
2011 Q2	374 628	29,224	12819	3983801	1,093	0.20	2806140	14181	1362	10.6	2.1
2011 Q3	376 862	29,063	12967	4078674	1,130	3.45	2903061	14406	1439	11.1	2.6
2011 Q4	376 462	29,146	12917	4075453	1,113	-1.50	2859536	14322	1405	10.9	2.4
2012 Q1	376 324	29,274	12855	4162726	1,182	6.17	3035852	14342	1487	11.6	3.1
2012 Q2	374 754	29,476	12714	4201759	1,182	0.01	3036176	14174	1460	11.5	3.0
2012 Q3	377 684	29,576	12770	4190643	1,204	1.81	3090982	14260	1490	11.7	3.2
2012 Q4	377 231	29,751	12680	4218121	1,195	-0.74	3068166	14138	1458	11.5	3.0
2013 Q1	378 759	29,708	12749	4176070	1,155	-3.36	2965010	14163	1414	11.1	2.6
2013 Q2	381 527	29,777	12813	4181799	1,171	1.43	3007335	14252	1439	11.2	2.7
2013 Q3	384 686	29,953	12843	4196639	1,164	-0.61	2988890	14266	1424	11.1	2.6
2013 Q4	387 459	30,146	12853	4368404	1,215	4.37	3119393	14336	1483	11.5	3.0
Increase											
Q1:08-Q4:13	-5327	636321	-458	510532	287070		737222	-143	315		
%	-1.4	2.2	-3.4	13.2	30.9		30.9	-1.0	26.9		
Q1:08-Q4:12	-15555	240774	-631	360250	267108		685995	-341	289		
%	-4.0	0.8	-4.7	9.3	28.8		28.8	-2.4	24.7		
Q4:08-Q4:12	1 843	422 282	- 120	415 185	269 409		691 906	210	330		
%	0.5	1.4	-0.9	10.9	29.1		29.1	1.5	29.2		
Q4:10-Q4:12	4702	630420	-113	242495	132506		340307	23	136		
%	1.3	2.2	-0.9	6.1	12.5		12.5	0.2	10.3		
Q4:10-Q4:13	14930	1025967	60	392778	152469		391534	221	161		
%	4.0	3.5	0.5	9.9	14.4		14.4	1.6	12.2		
Sources:											
ONS Statistical Bulletin: 2nd Estimate of GDP, Q3 2013, 26 Feb 2014, Table A2: National Accounts aggregates											
ONS A01 Labour market statistics summary data tables, Table A01 - Sheet 3, March 2014, Seasonally adjusted											
Notes											
1. The table assumes that 71% of the self-employed were unregistered in Q1 2013.											
2. The growing number of unregistered self-employed workers is assumed to follow the growth of PTSE workers.											
It back calculates 23.96% growth to give a Q4 2007 starting figure and then works forward by quarter.											

The different trajectories for the three scenarios can be seen in Figure 1. This shows that, following the financial crash of 2008, the greatest impact on changing levels of productivity takes place under the assumptions that 71% of the self-employed would have been unregistered at the start of 2013 and that the growth of this section of the labour force will have followed the path of the increase in part-time self-employment.

Figure 1



This suggests that the impact of the growth of unregistered self-employed workers on Britain's productivity during the recession is greater than originally thought. The data suggest that productivity in the UK may now be more than 11% higher than official quarterly figures propose. In addition, this difference between what is reported each quarter and what is actually happening is increasing over time. The methodology is consistent over time, but because of weaknesses in the way GDP is measured and then combined with the available labour market data, the productivity deficit is increasing. Over the period of the recession, there is a reduction of around three percentage points on what would be expected from historic trends. This is probably the largest single factor in the explanation for productivity conundrum.

7. Conclusions

For some, the argument about faulty GDP figures is political in its origins. The application of neo-liberal economic theory should not lead to a decline in output. On the contrary, as an expression of political faith, austerity must lead to growth and recovery. In support of this is the economic argument that suggests that early estimates are often revised later and these revisions after a recession tend to be in an upward direction. That is, as more data comes in, the GDP figures will be corrected upwards and all will be well. GDP will be realigned with employment, it will be shown to be more positive, the politics of neo-liberalism will be vindicated, and the ONS methodology will survive, perhaps with some minor tweaks. Unfortunately, neither the political nor the economic version of this argument is based on evidence. As we have seen, there is indeed a problem with the GDP figures, but it is not for the reasons proposed by the Chancellor and the Treasury. It is not just a question of under-reporting economic activity, more a matter of who is being asked to report and who is not.

To point out the methodological reasons for the discrepancies between the GDP data and the employment statistics is not simply to say that the trends in the growth figures are wrong or that the employment data are faulty. The GDP data continue to be gathered in the same way as they have been in the past, they permit international

comparisons, and any minor change in the methodology is normally reflected in a new configuration of the historic data. The sampling procedure has not changed and today's growth figures are comparable with the historic data – for a certain size of firm. The difficulty is that during the crisis an increasing sector of the economy is excluded from the statistics by the traditional methodology.

Historical comparison of the ONS information on the structure of employment is also valid. The problem arises when analysts attempt to link employment with GDP. Historical comparisons and related trend analyses are invalidated by the structural changes taking place in the UK economy. A key issue is the growth in part-time self-employment in recent years and the explosion of this type of work since the financial crisis of 2008. The vast majority of these firms are not captured by the business surveys used to compile the quarterly GDP figures.

The productivity conundrum exists partly because the methodologies used to gather the information have been overtaken by the growth of unregistered, insecure and precarious employment in the UK, which lies outside the sampling frame used to gather the GDP figures. This is a long-term process with a recent acceleration and it is possible that it may represent a temporary rapid growth phenomenon as a result of the financial crisis. However the long-term data indicate that a growing proportion of the UK economy is currently slipping below the radar of the state. In important ways it is becoming invisible and unregulated, with possible implications for health and safety, tax gathering, future pensions provision and therefore the welfare state.

These long-term and cyclical trends in the structure of the labour market call into question the assumptions that are made about the output of the self-employed and the way it is calculated. The data depend on both the reporting of income to the HMRC for tax purposes and the adjustments that are made by the ONS to take account of issues such as tax evasion. The precarious and unregistered self-employed will continue to under-report their income. The information in this paper suggests that the historical discrepancy between productivity that includes or excludes the unregistered self-employed should be throwing up greater differences between the quarterly and annual calculations of output and productivity than is currently the case. This suggests that there is an error in the assumptions that have

been made over a long period of time, which implies there is a need to review and revise these assumptions.

This under-recording combines with under-employment in both the formal sector of the economy and the precariously self-employed. This is the subject of another paper but we would anticipate that visible underemployment through involuntary part-time working and invisible underemployment in firms with unusually low productivity will be on different trajectories. Visible underemployment is part of a long-term trend that was catalysed by the crisis, whilst invisible underemployment may be more short-term and unsustainable⁴⁴. Without a considerable and sustained upturn in the economy, we are likely to see part-time self-employment continue to grow, albeit at a slower rate, and see the under-employed in the formal sector become unemployed, involuntary part-time employees, or precariously self-employed. Precarious self-employment provides a circuitous route to either unemployment or, given the age profile of the newly self-employed, retirement.

What we are seeing in the UK is not, of course, the same as the growth of the informal sector in developing countries. We are not referring to an increase in the urban poor selling shoe laces, chewing gum or single cigarettes from a tray on the street corner, nor small-scale artisanal production of clothes and shoes. The new self-employed of the UK labour market are more educated, more technically skilled and more likely to be professionals. There are however, some similarities between the precariously self-employed in the UK and the un-enumerated, unregulated and underemployed urban poor of Africa, Asia and Latin America. In particular, they are slipping out of the measurement of the formal economy and they are not being picked up in official economic statistics.

⁴⁴ For an earlier discussion of this see: Middleton, A. (2012) Underemployment and the Part-time Entrepreneur, Birmingham, The Governance Foundation (www.governancefoundation.org).

Annex 1	Growth in Employment, September (Q3) 1992-2014											
												(Thousands aged 16 and over, seasonally adjusted)
	All in employment					Full-time and part-time workers ¹						
	Total	Employees	Self employed	Unpaid family workers	Government supported training & employment programmes ²	Total people working full-time	Total people working part-time	Employees working full-time	Employees working part-time	Self-employed people working full-time	Self-employed people working part-time	
People												
Jul-Sep 1992	25,509	21,551	3,411	178	369	19,492	6,017	16,448	5,103	2,811	599	
Jul-Sep 1993	25,316	21,431	3,395	150	340	19,188	6,127	16,224	5,206	2,759	636	
Jul-Sep 1994	25,559	21,558	3,550	142	309	19,285	6,274	16,244	5,314	2,864	685	
Jul-Sep 1995	25,852	21,925	3,541	125	261	19,486	6,366	16,477	5,448	2,846	695	
Jul-Sep 1996	26,062	22,184	3,523	115	241	19,509	6,553	16,528	5,656	2,818	704	
Jul-Sep 1997	26,572	22,788	3,447	121	216	19,862	6,710	17,013	5,775	2,699	748	
Jul-Sep 1998	26,834	23,270	3,296	105	162	20,140	6,693	17,429	5,841	2,586	710	
Jul-Sep 1999	27,218	23,659	3,306	95	158	20,397	6,821	17,739	5,920	2,556	750	
Jul-Sep 2000	27,555	24,030	3,260	114	151	20,529	7,026	17,878	6,151	2,545	715	
Jul-Sep 2001	27,716	24,181	3,316	97	121	20,772	6,944	18,079	6,103	2,603	713	
Jul-Sep 2002	27,907	24,359	3,356	94	98	20,751	7,155	18,116	6,243	2,566	790	
Jul-Sep 2003	28,214	24,352	3,647	108	107	20,935	7,279	18,066	6,286	2,791	856	
Jul-Sep 2004	28,467	24,667	3,582	90	129	21,121	7,346	18,275	6,392	2,768	814	
Jul-Sep 2005	28,845	24,990	3,658	90	107	21,543	7,301	18,647	6,344	2,823	834	
Jul-Sep 2006	29,066	25,107	3,756	105	98	21,655	7,411	18,721	6,386	2,864	892	
Jul-Sep 2007	29,262	25,239	3,813	98	111	21,855	7,406	18,907	6,332	2,887	926	
Jul-Sep 2008	29,386	25,391	3,796	92	106	21,904	7,482	18,958	6,434	2,897	899	
Jul-Sep 2009	28,867	24,828	3,851	78	110	21,226	7,641	18,295	6,532	2,878	973	
Jul-Sep 2010	29,173	24,920	4,016	106	132	21,186	7,987	18,163	6,757	2,965	1,051	
Jul-Sep 2011	29,063	24,788	4,079	107	89	21,259	7,803	18,265	6,523	2,948	1,130	
Jul-Sep 2012	29,576	25,107	4,191	112	166	21,456	8,120	18,373	6,735	2,987	1,204	
Jul-Sep 2013	29,953	25,468	4,197	114	175	21,868	8,085	18,740	6,728	3,033	1,164	
Jul-Sep 2014	30,793	26,027	4,520	123	123	22,523	8,270	19,203	6,824	3,250	1,271	
	Total	Employees	Self employed	Unpaid family workers	Government supported training & employment programmes ²	Total people working full-time	Total people working part-time	Employees working full-time	Employees working part-time	Self-employed people working full-time	Self-employed people working part-time	
1992-2014												
Change	5,283	4,476	1,110	-55	-246	3,031	2,253	2,754	1,721	438	671	
Change %	20.7	20.8	32.5	-31.1	-66.7	15.5	37.4	16.7	33.7	15.6	112.0	
2008-2014												
Change	1407	635	724	31	16	619	788	245	390	352	371	
Change %	4.8	2.5	19.1	33.8	15.4	2.8	10.5	1.3	6.1	12.2	41.3	
2010-2014												
Change	1619	1107	504	16	-9	1337	282	1040	67	285	220	
Change %	5.5	4.4	12.6	15.3	-6.6	6.3	3.5	5.7	1.0	9.6	20.9	
2011-2014												
Change	1,730	1,239	442	16	34	1,264	466	938	301	301	140	
Change %	6.0	5.0	10.8	14.8	38.0	5.9	6.0	5.1	4.6	10.2	12.4	
2012-2014												
Change	1,217	920	330	11	-43	1,067	150	830	89	263	67	
Change %	4.1	3.7	7.9	9.7	-26.1	5.0	1.8	4.5	1.3	8.8	5.6	

Annex 1 Ctd.											
	Total	Employees	Self employed	Unpaid family workers	Government supported training & employment programmes ²	Total people working full-time	Total people working part-time	Employees working full-time	Employees working part-time	Self-employed people working full-time	Self-employed people working part-time
Men											
Jul-Sep 1992	14,035	11,213	2,524	53	244	13,053	981	10,582	631	2,328	197
Jul-Sep 1993	13,808	11,026	2,514	46	223	12,787	1,022	10,359	667	2,297	217
Jul-Sep 1994	13,981	11,113	2,623	45	200	12,880	1,101	10,385	728	2,391	233
Jul-Sep 1995	14,122	11,295	2,621	45	161	12,979	1,142	10,505	791	2,381	240
Jul-Sep 1996	14,200	11,394	2,616	37	153	12,933	1,267	10,475	920	2,364	252
Jul-Sep 1997	14,486	11,809	2,502	39	137	13,202	1,284	10,873	936	2,239	263
Jul-Sep 1998	14,606	12,073	2,401	33	99	13,318	1,289	11,092	981	2,148	253
Jul-Sep 1999	14,798	12,247	2,417	32	102	13,422	1,375	11,234	1,013	2,124	293
Jul-Sep 2000	14,925	12,440	2,352	37	96	13,554	1,371	11,398	1,042	2,086	265
Jul-Sep 2001	15,039	12,496	2,433	30	80	13,647	1,392	11,428	1,068	2,159	274
Jul-Sep 2002	15,069	12,524	2,449	36	61	13,557	1,512	11,382	1,142	2,132	317
Jul-Sep 2003	15,288	12,524	2,663	40	61	13,721	1,568	11,358	1,166	2,313	349
Jul-Sep 2004	15,406	12,656	2,641	34	76	13,765	1,641	11,421	1,235	2,295	346
Jul-Sep 2005	15,551	12,785	2,672	32	63	13,912	1,639	11,543	1,241	2,323	348
Jul-Sep 2006	15,709	12,887	2,721	43	59	13,996	1,713	11,594	1,293	2,356	364
Jul-Sep 2007	15,841	12,994	2,748	39	60	14,090	1,751	11,693	1,301	2,362	386
Jul-Sep 2008	15,859	13,009	2,755	31	64	14,025	1,834	11,621	1,389	2,374	381
Jul-Sep 2009	15,401	12,581	2,728	30	62	13,551	1,850	11,181	1,401	2,338	389
Jul-Sep 2010	15,655	12,682	2,844	44	85	13,591	2,064	11,156	1,526	2,396	448
Jul-Sep 2011	15,543	12,585	2,869	43	45	13,577	1,966	11,178	1,407	2,376	493
Jul-Sep 2012	15,877	12,772	2,946	49	111	13,740	2,137	11,237	1,534	2,431	514
Jul-Sep 2013	16,044	12,986	2,913	39	106	13,895	2,149	11,446	1,539	2,403	510
Jul-Sep 2014	16,388	13,153	3,113	53	70	14,240	2,149	11,605	1,548	2,586	526
	Total	Employees	Self employed	Unpaid family workers	Government supported training & employment programmes ²	Total people working full-time	Total people working part-time	Employees working full-time	Employees working part-time	Self-employed people working full-time	Self-employed people working part-time
1992-2014											
Change	2,354	1,939	588	0	-174	1,187	1,167	1,023	917	259	330
Change %	16.8	17.3	23.3	-0.4	-71.3	9.1	18.9	9.7	145.3	11.1	167.8
2008-2014											
Change	530	144	358	22	6	215	315	-16	159	212	146
Change %	3.3	1.1	13.0	71.9	9.2	1.5	17.2	-0.1	11.5	8.9	38.3
2010-2014											
Change	733	471	269	8	-15	648	85	449	22	190	78
Change %	4.7	3.7	9.5	19.2	-17.5	4.8	4.1	4.0	1.4	7.9	17.5
2011-2014											
Change	846	568	243	10	25	663	183	427	141	210	33
Change %	5.4	4.5	8.5	22.2	54.8	4.9	9.3	3.8	10.0	8.8	6.8
2012-2014											
Change	511	381	167	4	-41	500	11	368	14	155	12
Change %	3.2	3.0	5.7	7.3	-36.8	3.6	0.5	3.3	0.9	6.4	2.3

Annex 1 Ctd											
	Total	Employees	Self employed	Unpaid family workers	Government supported training & employment programmes ²	Total people working full-time	Total people working part-time	Employees working full-time	Employees working part-time	Self-employed people working full-time	Self-employed people working part-time
Women											
Jul-Sep 1992	11,474	10,338	887	125	125	6,439	5,035	5,866	4,472	484	403
Jul-Sep 1993	11,507	10,404	881	104	117	6,401	5,106	5,865	4,540	462	419
Jul-Sep 1994	11,578	10,445	926	97	109	6,405	5,173	5,860	4,586	474	452
Jul-Sep 1995	11,730	10,630	921	80	100	6,507	5,224	5,972	4,657	466	455
Jul-Sep 1996	11,861	10,789	906	78	88	6,576	5,285	6,053	4,736	454	453
Jul-Sep 1997	12,086	10,979	945	82	79	6,660	5,425	6,140	4,839	460	485
Jul-Sep 1998	12,227	11,197	895	72	64	6,823	5,405	6,337	4,860	438	457
Jul-Sep 1999	12,420	11,412	889	63	56	6,975	5,445	6,504	4,908	432	457
Jul-Sep 2000	12,630	11,590	908	77	55	6,975	5,655	6,481	5,110	459	449
Jul-Sep 2001	12,677	11,686	883	67	41	7,125	5,552	6,651	5,035	444	439
Jul-Sep 2002	12,837	11,835	907	58	37	7,194	5,643	6,735	5,100	434	473
Jul-Sep 2003	12,926	11,828	985	68	46	7,214	5,712	6,709	5,119	478	506
Jul-Sep 2004	13,061	12,011	941	55	53	7,356	5,705	6,854	5,157	473	469
Jul-Sep 2005	13,294	12,205	986	58	44	7,631	5,662	7,103	5,102	500	486
Jul-Sep 2006	13,357	12,220	1,036	62	39	7,659	5,698	7,127	5,093	508	528
Jul-Sep 2007	13,421	12,245	1,066	59	51	7,765	5,656	7,214	5,031	525	541
Jul-Sep 2008	13,527	12,382	1,042	61	42	7,879	5,648	7,337	5,045	523	518
Jul-Sep 2009	13,466	12,246	1,123	48	48	7,675	5,791	7,115	5,132	539	584
Jul-Sep 2010	13,518	12,237	1,172	62	47	7,595	5,923	7,006	5,231	569	603
Jul-Sep 2011	13,520	12,203	1,209	64	44	7,682	5,838	7,087	5,117	572	637
Jul-Sep 2012	13,699	12,336	1,245	63	56	7,717	5,982	7,135	5,200	556	689
Jul-Sep 2013	13,909	12,482	1,284	74	69	7,973	5,936	7,294	5,189	629	654
Jul-Sep 2014	14,404	12,874	1,408	70	53	8,283	6,121	7,598	5,276	663	744
	Total	Employees	Self employed	Unpaid family workers	Government supported training & employment programmes ²	Total people working full-time	Total people working part-time	Employees working full-time	Employees working part-time	Self-employed people working full-time	Self-employed people working part-time
1992-2014											
Change	2,930	2,536	521	-55	-72	1,844	1,086	1,732	804	180	341
Change %	25.5	24.5	58.8	-44.1	-57.8	28.6	21.6	29.5	18.0	37.2	84.8
2008-2014											
Change	877	492	366	9	10	404	473	261	231	140	226
Change %	6.5	4.0	35.1	14.6	24.7	5.1	8.4	3.6	4.6	26.8	43.5
2010-2014											
Change	886	637	235	8	6	688	198	591	45	94	141
Change %	6.6	5.2	20.1	12.6	13.0	9.1	3.3	8.4	0.9	16.6	23.4
2011-2014											
Change	884	671	198	6	9	601	283	511	159	92	107
Change %	6.5	5.5	16.4	9.8	20.6	7.8	4.9	7.2	3.1	16.0	16.8
2012-2014											
Change	705	538	163	7	-3	567	139	462	76	108	55
Change %	5.1	4.4	13.1	11.7	-5.0	7.3	2.3	6.5	1.5	19.4	8.0

Source: Labour Force Survey

1. The split between full-time and part-time employment is based on respondents' self-classification.

2. This series does not include all people on these programmes; it only includes those in any form of work, work experience or work-related training.

3. These series cover Employees and Self-employed only. These series include some temporary employees

4. The total includes those who did not give a reason for working part-time and it therefore does not equal the sum of columns 21, 23, 24 and 25.