What Are the Real Effects of Government Spending to Gross Domestic Product? The Case of the UK

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Abstract: Government expenditure has always been and will always be a hot topic of discussion. Budget allocation and cuts are often questioned; however, there is a limited amount of research and discussion of the real impact on the economy of the recent 'belt tightening' strategy in the UK. It has been announced that the government must cut its expenditure by an additional £16bn over the next year (2014). There has been concern that the impact to the economy in UK will be significantly bigger than the nominal budget cuts because of the macroeconomics theory of the multiplier. This study finds that the real impact to the GDP in the UK is significantly bigger than the nominal budget cut. As a result, these implications have been applied to future plans and an estimated impact has been calculated.

Introduction

This paper addresses the impact of the proposed UK government expenditure cuts on gross domestic product (later GDP) in response to the recent economic recession which began in 2008. In 2013 George Osborne, the UK finance minister, announced that under current plans most of the Whitehall departments will face another four years of budget cuts (Financial Times, 2013). It may look that a small budget cut may not have a significant influence to GDP which is a total of $2.476 trillion (equivalent £1.47 trillion) (World Bank, 2012).But, what are the real effects of government spending on the GDP of the UK? Comparison will be made with previous government expenditure in order to identify what might be the real effects to the future GDP. In order to answer this question it is necessary to examine other factors which contribute to GDP structure and how these factors affect the final GDP figure. These factors are mainly connected to a fiscal multiplier but can also be factors such as marginal propensity to save and other fiscal instruments.

However, there are supplementary questions that need to be examined and answered. These questions are the following:

- What is the marginal propensity to save in the UK? The analysis of this ratio will help to identify whether the population in the UK is spending more rather than saving.

- What is the multiplier in the UK's economy? The analysis of this ratio will draw a clear picture of the money cycle in the UK. In other words, how many times does £1 circulate in the economy before it is withdrawn?

- Finally, taking into account GDP and government spending in previous years, the two multipliers will be compared.

The main issue that needs to be explored with regards to government expenditure is firstly, what is the marginal propensity to save and, secondly, how does this affect the multiplier? It is necessary to take into account all the factors that influence the multiplier in the UK, including size of government expenditure and other components of GDP. In terms of marginal propensity to save, it is necessary to find the root causes of the consumption and saving rates, which is suspected to be either the interest rate or disposable income.

The general aim of this paper is to investigate the real effects of government spending in GDP in the UK by applying macroeconomics theory. It is not the total amount of government expenditure that raises a concern, but the impact on the whole economy made by the government's fiscal policy in the UK. By applying macroeconomics models, the author will show that the impact on the GDP will be either greater or smaller due to the multiplier effect.

The objectives of this study are:

- By collecting data from reliable sources will help to identify whether the consumers in The UK are either spending or saving more.
- By calculating the marginal propensity to save and constructing the multiplier, the second research question, regarding the multiplier, will be answered.
- By taking into account historical fluctuations in GBP due to government expenditure, to investigate the real effects of budget cuts to GDP in the UK. This will also show whether the real effects are greater or smaller for nominal changes in government spending.

The next section will be a literature review which will seek to provide a general overview of the macroeconomics theories of GDP and multiplier. In addition, it will also identify and define the key indicators which will be used in further sections.

This research uses secondary data collected from The Office for National Statistics (later ONS) and the World Bank. Analysis is done to answer the questions raised in the introduction. In addition, the hypotheses raised in the previous section will be tested and the findings will be discussed.

The final section will draw conclusions and point out the limitations of this research. In addition, recommendations and future developments will be given.

Literature Review

In order to be able to investigate the real impact of government expenditure to GDP in the UK, it is vital to understand the key concepts of multiplier and GDP. In addition, other factors, such as marginal propensity to save and interest rates, will be brought into the research due to fact that it might be seen as vital indicators of the multiplier.

Ilzetzki et al. (2011) has researched the size of fiscal multiplier in 44 countries, depending on key characteristics i.e. exchange rate regimes, openness to trade and public indebtedness. They have based their research on the structural vector autoregression (SVAR) model. Gottschalk (2001) stresses that this model is commonly used by applied macroeconomists, however it may be too complicated to make use of this model without an understanding of monetary transmission mechanism and sources of business cycle fluctuations. In addition, Cimadomo et al. (2012) has researched the fiscal multiplier in Germany, UK and United States, using the same SVAR models. The research was based on historical data collected over 30 years ago. It might be questioned the need of such size of data and the implications of SVAR models in analysing this data. Cimadomo et al. (2012) have concluded that the multipliers in the UK were low and were only picked up at the very end of the sample. This might indicate the limitations of SVAR models. Having this all in mind, the author has noticed that a less scientific research requires to be carried out in order to provide a better understanding of GDP and the multiplier itself.

Garratt et al. (2011) refers to the multiplier as the number of times which a rise in national income exceeds the rise in injections that caused it. In order to refer to GDP, it is necessary to understand the calculation of GDP and what are the injections.

GDP can be calculated either in expenditure approach or income approach. The author will focus on expenditure approach due to the nature of this paper. The GDP can be calculated with the following formula:

Expenditure approach: GDP=C+I+G+(X-M),

Where C stands for consumption, I – investment, G – government expenditures, X – export and M – import.

It can be seen, that all of the elements, except import, can be called as injections due to the fact that they all contribute towards a higher GDP.Even so, Garratt et al. (2011) has questioned the original understanding of the multiplier theory, which says that the multiplier can be found by the following formula:

Multiplier = 1/marginal propensity to consume

Garratt et al. (2011) claim that this formula is incorrect, if there is more than one injector, usually investment. Even though, in the current economic environment this statement is correct and a country has more than one injector, however knowing the nature of this paper and the fact that the focus is on one injector, the author has decided to assume that government expenditure is the only injection and the rest are classified as ceteris paribus (all other conditions remain the same).

Over the last 20 years, government expenditure in the UK has been influencing significant influence on the GDP by the amount of money spent for public goods and services.

Figure 1. The UK: Government Spending

The UK: Government Spending from 1994 to 2012
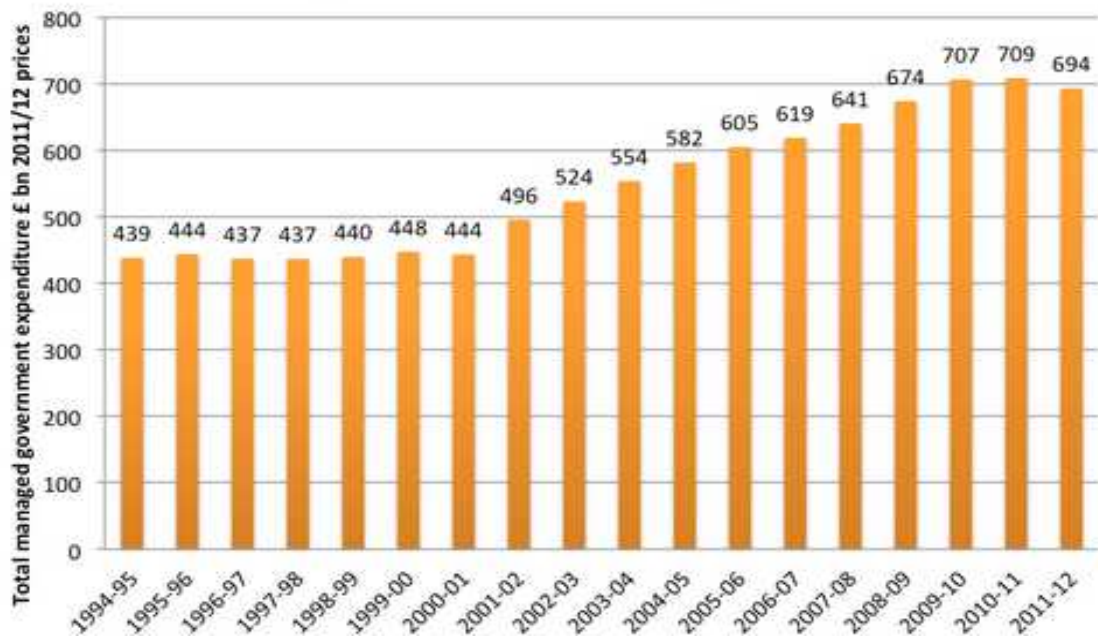
Clearly seen is the fact that the government in the UK has almost doubled its expenditure over the last 15 years which has evidently had a positive impact on the growth of GDP in the UK. In order to interpret the graph above, two values (from 1994-1995 and 2011-2012) have been compared. It is obvious that government in the UK has increased its expenditure by 58% since 1994. It must be noted that 2011/2012 has been taken as a base year, in other words

Figure 2. The UK: GDP History
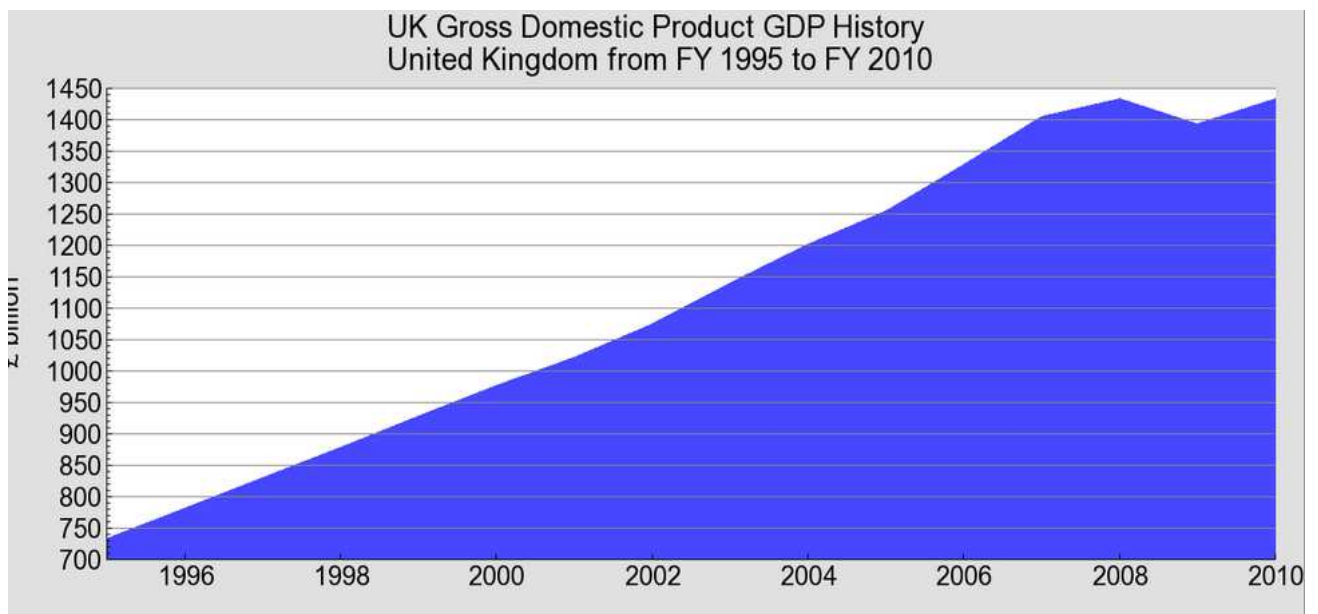
figures for each year has been converted to 2011/2012 price levels in order to create a representative example. As already stated there is a strong correlation between GDP and government expenditure using an expenditure approach of calculating GDP. In order to support this statement it is necessary to analyse GDP over time. Figure 2 shows the GDP in the UK since 1996. It can be seen that GDP has been steadily growing till 2008 when the global recession started. In addition, an interesting observation arises; the UK government expenditure between 1995-2000 was at the same level and started increasing afterwards, however, there was no such increase in GDP after 2000 and it has remained growing at the similar pace.

In order to understand this relationship an additional graph must be taken into consideration (see Figure 3). It can be noticed that the UK government's contribution towards the GDP has varied from 34% to 47% over the last years, meaning that the GDP has become more reliant on government expenditure that it was in the year 2000 when the percentage dependence was only 34%.

Figure 3. The UK: Government Spending as % of GDP

The UK: Government Spending as % of GDP from 1994 to 2012
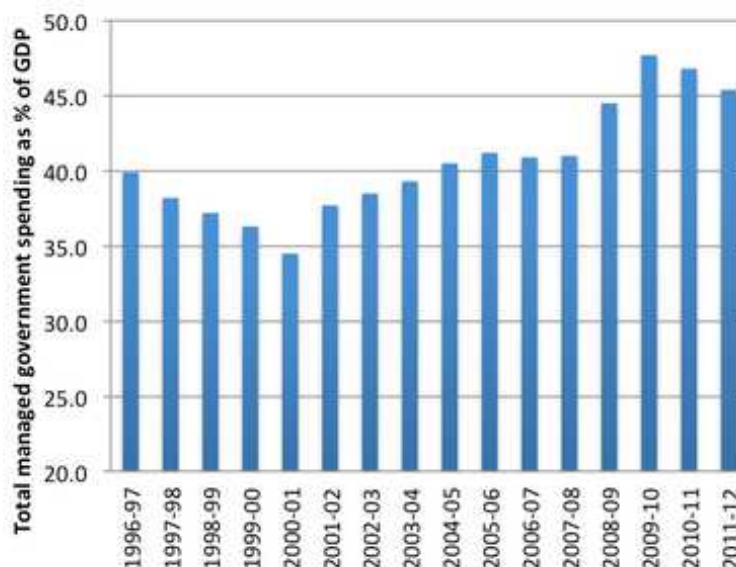
As a result, it may be concluded that even though GDP is dependent on government expenditure, there are other factors which have to be taken into account. The interest rate is often used as a tool to control the economy within a country. Garratt et al. (2011) states that by controlling the interest rate, the Central Bank (for example Bank of England in the UK) can affect the aggregate demand by altering the supply or cost of money. In other words, by reducing the cost of borrowing the central bank may stimulate the economy to consume more. Interestingly, if the two graphs are compared (Figure 1 and Figure 4) it may look as though there is no correlation between these two indicators. However, an indirect relationship can be found. Besley (2007) suggests that the higher interest rate will encourage bigger consumption in the future. Having in mind this statement, it can be assumed that the bigger the interest rate, the lower consumption is. This assumption is due to the fact that people will

tend to save more and consume less. As a result of higher interest and their money being 'frozen', people will be able to spend their savings plus interest in the future.

Figure 4. The UK: Interest
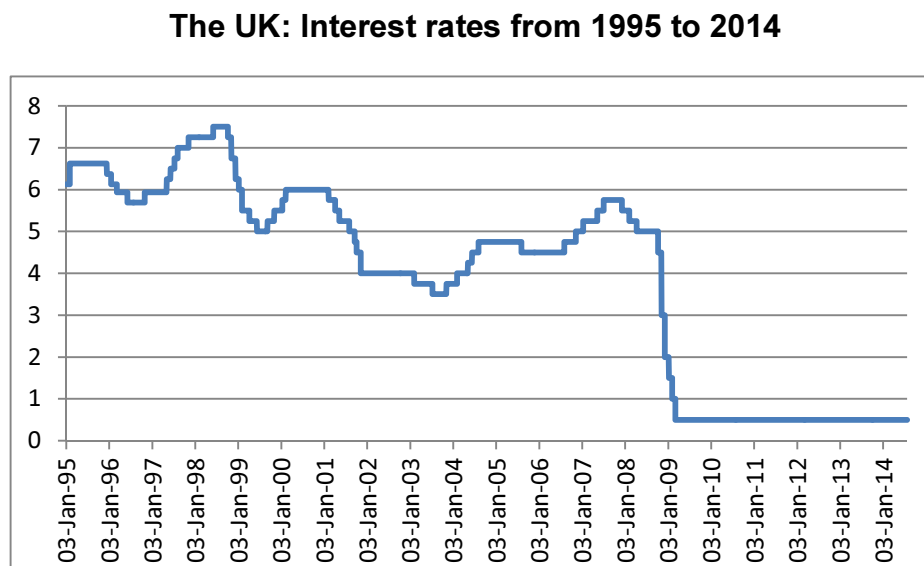
The UK: Interest rates from 1995 to 2014

Figure 4 above also suggests that the Bank of England is not encouraging saving, but rather spending at this moment. The current interest rate is set at 0.5 per cent (Figure 4.) which means that for every £1 saved, people will receive an interest of half a penny. In comparison to 1999 when the interest rate was set at 7.5 per cent, meaning that in 2014 the interest rate was 15 times lower. In addition, in early 1980s the interest rate has been set to 17 per cent, which was thirty five times bigger than the current interest rate (Bank of England, 2014). As a result, this indicates that the population of the UK was strongly advised to save rather than spend. However, the saving ratio in the UK has dramatically changed over the last 15 years.

Figure 5. The UK: Savings ratio
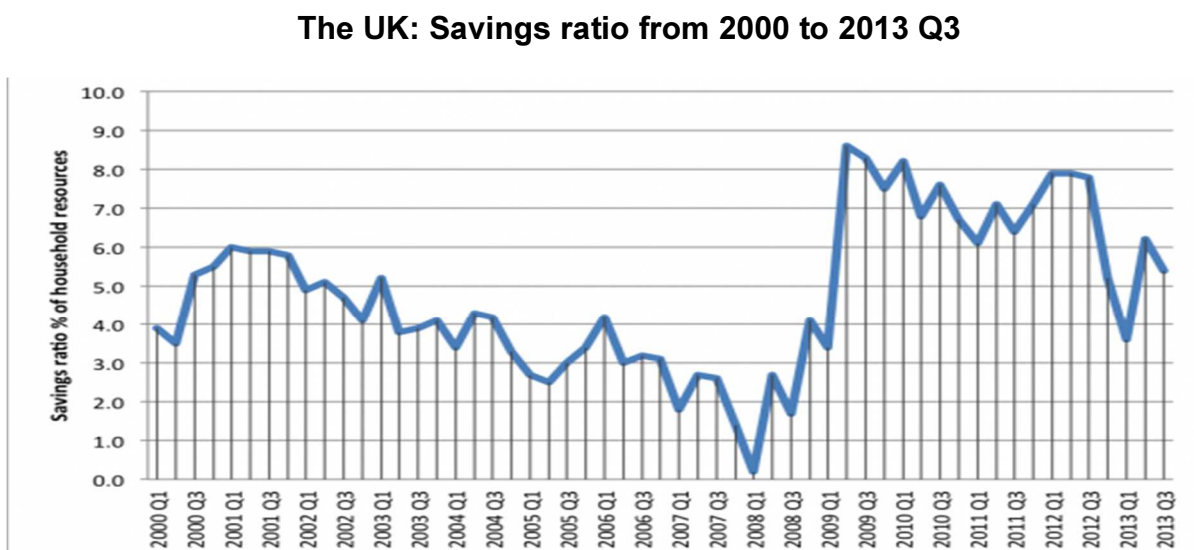
The UK: Savings ratio from 2000 to 2013 Q3

Figure 5 suggests that saving ratio in the UK has dropped almost to 0 during 2008; in fact in the first quarter of 2008 it was 0. In other words, the consumption in the UK was equal to disposable income, meaning that people were not saving at all at the beginning of 2008. Even

though Garratt et al. (2011) suggests that lower interest rate discourages from saving, Pettinger (2014a) explains why this economic theory was wrong during the recession which started in 2008.

According to Pettinger (2014a), there are several reasons why the savings ratio tends to rise in a recession. Firstly, there is the threat of unemployment. The author suggests that people worry about unemployment and delay bigger purchases. As a result, they are more cautious about borrowing and spending. This statement has been supported by a rise in unemployment in 2008 (ONS, 2014), when the unemployment rate rose from 1.61 per cent to 2.47 per cent within a year. Secondly, banks were trying to improve their balance sheets by attracting more deposits and restricting lending (Pettinger, 2014b). As a result, in 2008 it became noticeably more difficult to borrow.

With the effective use of the interest rate, consumption and saving ratios can be altered to influence GDP growth. Even though Besley (2007) suggested that a lower interest rate leads to lower savings, as the recession started in 2008 and people started reacting to it by saving more due to the threat of unemployment and banks restricting lending (Pettinger, 2014a).

In 2013, George Osborne announced that most of the Whitehall department will face another four years of 'belt tightening', leading to a total budget cuts of around £16bn (Financial Times, 2013). Knowing multiplier theory, which claims that the real value of these cuts might be significantly higher than the nominal value (Garratt et al., 2011) naturally raises a question, whether the government understands the real impact of these budget cuts on the economy and more precisely on the GDP. According to recent publications and discussions it may seem that the government has also planned additional measures to reduce the impact of the 'belt tightening' strategy. According to Simpson (2014), Derby Council has suggested taxing the big retailers with an additional levy. It has been suggested that these extra rates, of up to 8.5%, would affect any large retail outlet with a rateable value of more than £500,000 (Simpson, 2014). The rationale given by the local authorities is that the big retailers must support local communities, rather than harming the sustainability of these communities. This statement has been supported by research results, which show that only 5% of the money recirculates in the local economy,. Even though, this new levy may give an impression that it is just a minor action, however, it shows a clear indication that there is a sound knowledge of the multiplier effect. The research (Simpson, 2014) showed that this new tax could raise up to £400m a year. In addition, Corsetti et al. (2012) claims that reduction in government spending leads to higher consumption by households. As a result, linking the 'Tesco tax' and the statement mentioned by Corsetti et al. (2012), it would seem logical that the government understands that consumption will increase and it is trying to suggest new taxes which would help to recirculate the money in the economy, leading to a bigger GDP.

Methodology

This research will not create new theory but rather test the existing macroeconomics theory of multiplier. After taking into consideration the available strategies, the author has decided to employ an archival research strategy. Lewis et al. (2009) suggests that researchers who apply this strategy make use of administrative records and documents as the principal source of data.

It can be noticed that the author of this research has focused on various secondary data in the literature review. As a result, this principle will continue in the data collection section. The author collected the data from various recognised bodies and organisations (i.e. ONS, Bank of England, World Bank and etc.). It is assumed that censuses, together with continuous and

regular surveys will provide most of the data. However, multiple source secondary data will not be ignored. Time series based secondary data will be important due to the fact that government publications are crucial for this research.

Furthermore, the author has decide to focus on secondary data only due to the fact that the author assumes that the advantages of such data outweighs the advantages of primary data, while minimising disadvantages of the selected data type. For example, for this research, and objectives, the main advantage of using secondary data is the significant saving in resources, to be more precise, time and money (Lewis el at., 2009). It would be extremely costly and time consuming to collect primary data for this research. In addition to that, the author assumes that the secondary data already collected with regards to GDP and government spending will be of a better quality than it could be gained by gathering our own data. Finally, the author accepts that the disadvantages outlined by Lewis et al. (2009) will not impact this research. For example, it states that the secondary data collected may be for a purpose that does not match the needs of this research. However, the author of this research takes into consideration that the topic of this research is in the interest of the public; as a result, the amount of available secondary data should outweigh this disadvantage. In addition, Lewis et al. (2009) claims that accessing the data may be costly or difficult. Yet, as already mentioned, the topic of the research concerns public and government expenditure, in other words, there are independent organisations such as ONS or World Bank which provide such data.

To sum up, the data collection section indicates the focus of the author on the secondary data, due to its advantages outweighing the possible threats. In addition, data selection section highlights that the author is planning to focus on quantitative data rather than qualitative. The rationale behind such selection is that quantitative data will be used to calculate multiplier and GDP, while it would be impossible to do so using qualitative.

Data Analysis and Findings

The analysis has been split into three sections which represent the supplementary questions raised in the introduction:

- What is the marginal propensity to save in the UK? The analysis of this ratio will help to identify whether the population in the UK is spending more rather than saving.
- What is the multiplier in the UK's economy? The analysis of this ratio will draw a clear picture of the money cycle in the UK. In other words, how many times a £1 circulates in the economy?
- Finally, taking into account GDP and government spending in previous years, the two multipliers will be compared.

Marginal propensity to save is defined as the proportion of an increase in income saved (Garratt et al., 2011). In other words, the calculation of this ratio shows how much of every additional pound received as income would be saved. The calculation of this ratio is the following:

$$MPS = \frac{\text{Change in Savings}}{\text{Change in Income}}$$

In order to calculate this ratio, it is necessary to collect the data about disposable income and savings. As already discussed in data collection chapter, secondary data have been used to collect the information about changes in savings and disposable income (Table 1).

Table 1. Disposable income and Saving Ratio

Year/Quarter	Disposable income in £m	Year/Quarter	Savings ratio %
2010 Q1	250300	2010 Q1	8.2
2010 Q2	249641	2010 Q2	6.8
2010 Q3	250941	2010 Q3	7.6
2010 Q4	248947	2010 Q4	6.7
2011 Q1	245782	2011 Q1	6.1
2011 Q2	247517	2011 Q2	7.1
2011 Q3	246806	2011 Q3	6.4
2011 Q4	247981	2011 Q4	7.1
2012 Q1	250026	2012 Q1	7.4
2012 Q2	255901	2012 Q2	8.1
2012 Q3	254859	2012 Q3	7.8
2012 Q4	252225	2012 Q4	6.1
2013 Q1	247977	2013 Q1	4.2
2013 Q2	253304	2013 Q2	6
2013 Q3	255364	2013 Q3	5.8

The data collected in Table 1 have been summarised in the Table 2:

Table 2. Disposable income and savings ratio

Year	Disposable income in £m	Savings in %	Savings in £m
2010	999 829	7.3	73 237
2011	988 086	6.7	65 955
2012	1 013 011	7.4	74 456

In order to apply the formula suggested by Garratt et al. (2011), it is necessary to have both values in the same units, i.e. it can be noticed that disposable income has been expressed in currency, while savings in percentage value. As a result savings have been multiplied by disposable income and the results have been shown in the right hand column of Table 2.

It must be noted, that at the time of this research data for 2013 Q4 for these measures was not available; as a result, calculations and the analysis is focuses on the period between 2010 and 2012. The calculations of the marginal propensity to save have been presented in Table 3.

Table 3. Marginal propensity to save and consume

Year	Marginal propensity to save	Marginal propensity to consume	Multiplier
2011	0.62	0.38	1.61
2012	0.34	0.66	2.93

Table 3 shows that the marginal propensity saved has dramatically changed between 2011 and 2012. In 2011, for every additional pound received, 62 pence has been saved; while in

2012 only 32 pence has been saved. The rationale behind this might be that the there was a negative growth in disposable income.

In order to calculate the multiplier effect, as suggested by Marglin et al. (2013), the marginal propensity to consume has to be calculated. Garratt et al. (2011) refers to marginal propensity to consume as a proportion of a rise in income that is allocated to consumption. In other words, it shows how much is spent rather than saved for every additional pound earned. Garratt et al. (2011) suggests that marginal propensity to save added to marginal propensity to consumer equates to 1. Strictly speaking, the sum of these ratios is equals to total rise in income. As a result, marginal propensity to consume has been calculated by subtracting marginal propensity to save from 1.

Table 3 indicates that for every additional pound which was earned, 38 and 66 pence was spent on consumption in 2011 and 2012 respectively. Having in mind marginal propensity to consume, the multiplier can now be calculated by applying the multiplier formula. The findings of calculating multiplier have been presented in Table 3. Table 3 indicates that for every £1 spend in the economy; it circulated 1.61 and 2.93 times, in 2011 and 2012 respectively, before it has been withdrawn.

After finding out that the money has circulated 1.61 and 2.93 times within the economy, the multiplier has to be applied to government spending in order to analyse the impact of the government spending. As already highlighted earlier the government expenditure was £709bn in 2011 and £694bn in 2012, while the GDP was £3,866.34bn in 2011 and £4,147.56bn in 2012 (World Bank, 2014). Thus, the real impact of government expenditure in 2011 was £1,143.32bn and £2,034.68 in 2012. In other words, due to the multiplier effect, government expenditure had a greater real impact on the GDP than the nominal. It can be noticed that even though the initial government spending was lower in 2012 by £15bn, the analysis shows that it had greater impact on GDP than in 2011, due to the multiplier effect being higher in 2012 than in 2011.

Discussion and conclusions

The lack of research done on this topic has encouraged the author to focus on macroeconomics theory without a use of applied economics tools. As a result, the research carried out in the previous sections has confirmed the theory of multiplier effect. As Garratt et al. (2011) suggests, the real impact to the GDP has been greater than the nominal. For example, in 2011 government expenditure was £709bn and generated £1,143.32bn toward the total GDP. Knowing the research results it can be assumed that the real impact on the GDP due to government planned budget cuts will be greater than nominal £16bn. Taking into consideration both multipliers into account it is estimated that the real impact over four years will be between £25.80bn and £46.91bn less money generated in the GDP in the UK due to planned budget cuts of £16bn. This proves the hypothesis set for this research to be valid.

The research questions were tailored to calculate the real impact of government expenditure in the UK's GDP by applying macroeconomics theory. The data analysis has showed that the marginal propensity to save was 0.62 in 2011 and 0.34 in 2012. This may indicate that population in the UK had dramatically changed their buying and saving habits, since the marginal propensity to save has changed by 45% within a year. In order to obtain a better result, it might be useful to collect more data over a longer period of time, due to the fact that it is expected the ratios not to change by such a high percentage. Furthermore, the second supplementary question analysed the multiplier effect. The findings revealed that the multiplier was 1.61 in 2011 and 2.93 in 2012. Same as the first supplementary findings, the

data varies by a significant value, in this case by almost 82%, which indicates a further need of investigation to be carried out. As Garratt et al. (2011) suggested having one injection may not be valid when compiling the multiplier. This might be the reason for having such a variance in the results. Moreover, the last supplementary question was most related to the aim of this investigation and analysed the real impact on the GDP. The analysis carried out revealed that even though the government spending in 2011 was higher than in 2012, the impact on real GDP was lower due to the fact that the money circulated more cycles in 2012 than in 2011. Once this analysis showed the real impact, the multiplier effect has been applied in order to perform a future analysis. After applying the multiplier to predicted cuts of government expenditure of £16bn, the results showed that the real impact of these cuts will be between £25.80bn and £46.91bn over the next four years. It must be noted that this variance incurs due to several reasons. For example, even though the interest rates do not directly affect the GDP, however this ratio cannot be ignored. The rationale behind this is that there is strong correlation between interest rate and consumption. Figures 4 and 5 show a clear link between these two measures, showing that once the interest rate is amended by Bank of England, the saving ratio acts accordingly. In addition to that, the research has ignored the influence of credit availability to the population in the UK. Even though credits and loans are not seen as an income, however by using credits and delaying the payments consumers are able to increase their savings in the short run, while it has a significant effect on the repayment period. Euromonitor (2014) has announced that the use of credit cards has grown by 7% in 2013; as a result, this growing trend might indicate a need of a further research carried out in order to draw a clearer picture about the multiplier.

This research has focused only on government spending as a sole injector to the GDP, assuming ceteris paribus conditions. However, in the current economic climate it is impossible to assume that other injectors such as consumption, export and investment will remain unchanged over the period of time.

There is a need of carrying out further research around the macroeconomics. Current research is based on SVAR methods, which are used by applied economists. However, the author assumes that there is a need for implementing the use of applied software at an earlier stage in order to make the research in this topic deeper.

Bibliography

Bank of England (2014). *Bankstats* (monetary & financial statistics) – March 2014. Available at: http://www.bankofengland.co.UK/statistics/Pages/bankstats/2014/mar.aspx (Accessed 26 May 2014)

BBC. (2012). *Government departments are asked to find £16bn more savings*. Available at: http://www.bbc.co.UK/news/UK-politics-17809650 (Accessed: 26 May 2014)

Besley, T. (2007). Consumption and interest rates. Bank of England. *Quarterly Bulletin*, 47(3), pp. 471-476

Cimadono, J. and Quere, B., A. (2012). Changing patterns of fiscal policy multipliers in Germany, the UK and the US. *Journal of Macroeconomics*, pp. 845-873

Corsetti, G., Meier, A. and Muller, G., (2012).Government Spending Multipliers. Economic Policy, pp. 521-565

Euromonitor. (2014). Financial cards and payments in The UK. Available at: http://www.euromonitor.com/financial-cards-and-payments-in-the-united-kingdom/report (Accessed: 25 July 2014)

Neville, S. (2013). Osborne opens battle on size of the state. Available at: http://search.proquest.com.ezproxy.uwl.ac.UK/docview/1372703641 (Accessed on 24 May 2014)

Garratt, D. and Sloman, J. (2011). *Essentials of economics*. 5th edn. Harlow: Pearson Education

Gottschalk, J. (2001). *An introduction into the SVAR methodology: identification, interpretation and limitations of SVAR Models*. Working paper, Kiel, Institut für Weltwirtschaft.

Henry, B. (2011). *Fiscal policy in the UK*. Economic outlook, pp. 12-16

Ilzetzki, E. and Mendoza, E.G. (2011). How big (small) are fiscal multipliers? *Journal of Monetary Economics*, 60(2), pp. 239-254

Lewis, P., Saunders, M. and Thornhill, A. (2009). *Research methods for business student*s. 5th edn. Harlow: Pearson Education Limited

Marglin, S., A. and, Spiegler, P. (2013), Unpacking the multiplier: making sense of recent assessments of fiscal stimulus policy. *Social Research*, 80(3), pp. 819-854

Office For Budget Responsibility. (2014). *Annual report and accounts* 2013-2014. Available at: http://budgetresponsibility.org.UK/wordpress/docs/Final-AR-web-version.pdf (Accessed: 21 July 2014)

Office For National Statistics. (2013). Regional gross disposable household income (GDHI) 2011. Available at: http://www.ons.gov.UK/ons/rel/regional-accounts/regional-household-income/spring-2013/stb-regional-gdhi-2011.html (Accessed on 14 May 2014)

Pettinger, T. (2014a). *Saving ratio in The UK*. Economics Help Blog, 1 January. Available at: http://www.economicshelp.org/blog/848/economics/savings-ratio-UK/ (Accessed : 27 July 2014)

Pettinger, T. (2014b). *The UK: government spending*, Economics Help Blog, 21 March. Available at: http://www.economicshelp.org/blog/5326/economics/government-spending/> [(Accessed : 27 July 2014)

Simpson, E. (2014). *English councils propose 'Tesco Tax'*. Available at: http://www.bbc.co.UK/news/business-28495631 (Accessed: 29 July 2014)

Stewart, H. (2012). *George Osborne's austerity is costing UK an extra £76bn, says IMF*. Available at: http://www.theguardian.com/business/2012/oct/13/imf-george-osborne-austerity-76bn (Accessed on 11 August 2014)

World Bank. (2012). *The UK*, Available at: http://data.worldbank.org/country/united-kingdom (Accessed: 24 May 2014).