

Article

Understanding the different approaches of measuring owner occupiers' housing costs (OOH): Weights analysis

Owner occupiers' housing costs (OOH) are the costs of housing services associated with owning, maintaining and living in one's own home. There is not a single defined measure of OOH because they can be calculated differently depending on what the target is.

Contact:
Tanya Flower
tanya.flower@ons.gsi.gov.uk

Release date:
10 January 2017

Next release:
To be announced

Correction

21 March 2017

A correction has been made to the first payments approach for calculating owner occupiers' housing costs – OOH (Payments 1). This was due to a small error when aggregating the sub-indices. You can see the original content in the superseded version. We apologise for any inconvenience.

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1 . Authors

Tanya Flower, Arturas Eidukas and Ruth Donovan.

2 . Summary

This article explores 3 different approaches that measure owner occupiers' housing costs (OOH) at 3 different points; that is, the point at which owner occupier housing services are used, acquired or paid for. These approaches are: the rental equivalence approach, the net acquisitions approach and the payments approach.

Each of the approaches can be aggregated with the headline measure of inflation, the Consumer Prices Index (CPI), to create a hybrid aggregate inflation measure which includes OOH as measured by each approach. The difference between the average annual growth rates for these aggregate price indices is 0.2 percentage points over the period between 2006 and 2015.

The average annual growth rate over the period between 2012 and 2015 varies by 0.1 percentage points. This period is less affected by the economic downturn.

3 . Introduction

This article is part of a series which aim to provide more information about the different approaches to measuring owner occupiers' housing costs (OOH) to aid your understanding of the differences in concept and underlying methodology. In particular, this article presents a hybrid aggregate inflation measure which incorporates OOH as measured by each approach alongside the headline measure of inflation, the Consumer Prices Index (CPI). This allows us to compare the different approaches with the Consumer Prices Index including owner occupiers' housing costs (CPIH), which will be our headline measure of inflation from March 2017 (please see the [National Statistician's statement](#) for more information). The CPIH uses the rental equivalence approach – OOH(RE) – to calculate OOH.

For a more general discussion of the different approaches, please see the latest [Understanding the different approaches of measuring owner occupiers' housing costs \(OOH\)](#). These articles will be published on a quarterly basis to evaluate the performance of the different measures over time, in prevailing economic conditions. Users should note that the payments approach and net acquisitions are both experimental indices and therefore we would caution against any use other than for research purposes. We are continuing to work on identifying possible improvements to the current methodology and data sources. Any changes to the indices will be highlighted in the future quarterly releases.

4 . A brief description of owner occupiers' housing costs

The Consumer Prices Index including owner occupiers' housing costs (CPIH) is currently identical to the UK's headline measure of consumer price inflation, the Consumer Prices Index (CPI), with the additional inclusion of a measure of owner occupiers' housing costs (OOH). From March 2017, CPIH will also include a measure of Council Tax in the index (please see the [National Statistician's statement](#) for more information). OOH are the costs of housing services associated with owning, maintaining and living in one's own home. This is distinct from the cost of purchasing a house, which is partly an accumulation of wealth and partly for housing services.

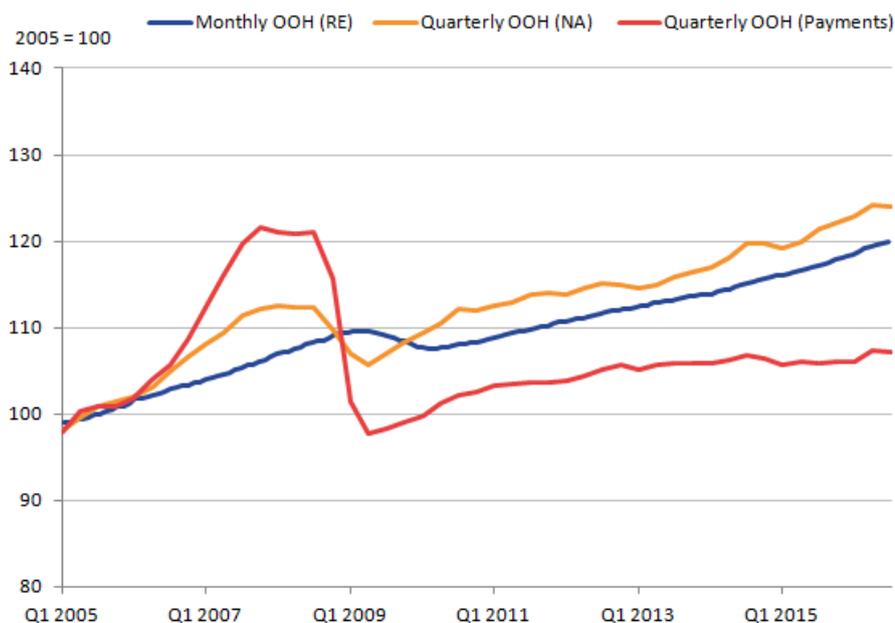
There is not a single defined measure of OOH because it can be calculated differently depending on what the target is. In particular, should OOH be measured at the point of acquisition of the housing service (for example, the net acquisitions approach), the point of use (for example, the rental equivalence approach), or the point at which it is paid for (for example, the payments approach)? Each of these 3 approaches has its own specific methodological strengths and weaknesses, and is measured using different methods.

5 . Comparing the different approaches of measuring owner occupiers' housing costs

Although each of the methods discussed in Section 4 measure different aspects of OOH and are therefore not comparable, it is still useful to look at the 3 measures together to see how they differ over time. Figure 1 presents the rental equivalence approach – OOH(RE), the net acquisitions approach – OOH(NA), and the payments approach – OOH(Payments), indexed to 2005 = 100. This analysis is also presented in the [most recent quarterly article](#). It suggests that since 2005, OOH(NA) has shown the strongest growth over the period. OOH(Payments) saw strong growth prior to the economic downturn due to price increases in mortgage interest payments. Of the 3 measures, it has also seen the largest fall since the economic downturn, again driven by the falling price of mortgage interest payments, and has still not recovered its pre-downturn peak.

Figure 1: OOH(RE), OOH(NA) and OOH(Payments) indices, 2005 = 100

UK, Quarter 1 (Jan to Mar) 2005 to Quarter 3 (July to Sept) 2016

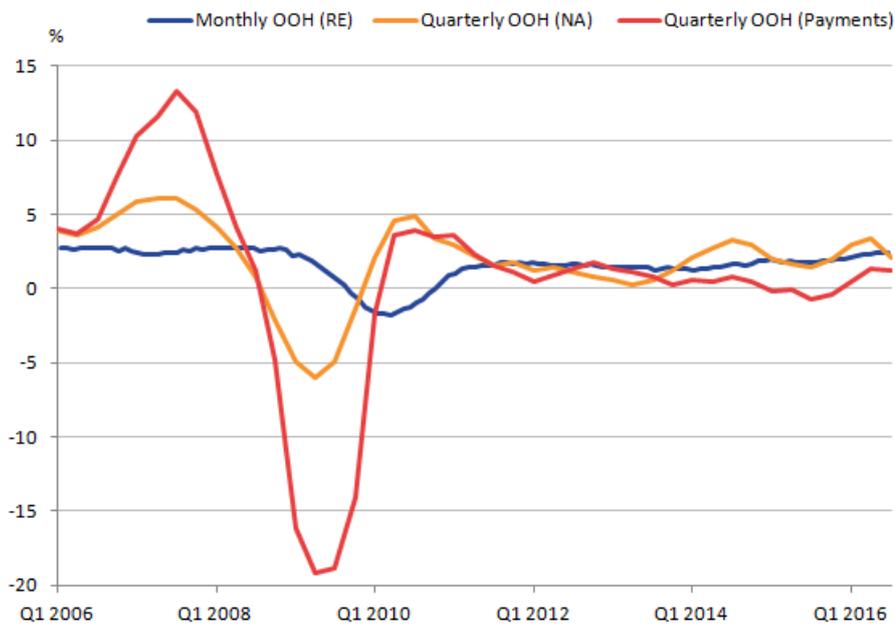


OOH(RE) appears at a lag to the OOH(NA) and OOH(Payments) approaches for the peak and trough before and after the economic downturn. This can be seen more clearly in Figure 2, which presents the quarter on corresponding quarter in previous year growth rates for the 3 approaches. This lag is because OOH(RE) is a “stock” measure of rents. This means that it captures price information for the entire stock of rental properties, which includes existing contracted properties and properties that are new to the market. Therefore, the flow of new rents based on recent developments in house prices will only gradually influence its development because the stock of existing dwellings is so much larger. This also means that the relative peaks and troughs of OOH(RE) will be subdued relative to OOH(NA) because the large stock of contracted rental properties is likely to mute the impact of volatile house prices.

The fact that OOH(RE) does not directly follow house prices is not a disadvantage to using the rental equivalence approach in the calculation of the owner occupier's housing costs component in CPIH. This is because the rental equivalence approach aims to measure the housing services that are consumed each period, and therefore there is no reason why it should follow the trend of house prices. If consideration is required of house prices, the House Price Index (HPI) should be used instead.

Figure 2: OOH(RE), OOH(NA) and OOH(Payments) growth rate, quarter on corresponding quarter of previous year

UK, Quarter 1 (Jan to Mar) 2006 to Quarter 3 (July to Sept) 2016



The annual growth rates for each approach are given in Table 1. The table also presents the average growth from 2006 to 2015, and 2012 to 2015. While OOH(NA) has the highest average growth rate of the 3 approaches over the period, there is only a 0.1 percentage point difference between the average growth rate of OOH(NA) and OOH (RE) since 2012.

Table 1: Annual growth rates for the different approaches of measuring OOH, 2006 to 2015

	OOH(RE)	OOH(Payments)	OOH(NA)
2006	2.7	5	4.2
2007	2.5	11.8	5.9
2008	2.7	2.1	1.4
2009	0.9	-17.1	-4.3
2010	-1	2.3	3.7
2011	1.5	2.1	2.1
2012	1.7	1.1	1.2
2013	1.4	0.9	0.7
2014	1.5	0.6	2.8
2015	1.9	-0.4	1.8
Average ¹ : 2006 to 2015	1.6	0.6	1.9
Average: 2012 to 2015	1.6	0.4	1.7

Source: Office for National Statistics

Notes:

1. The average presented here is the compound average annual growth rate, which is a more appropriate measure of average growth over multiple time periods than the arithmetic average.

6 . Different approaches of measuring owner occupiers' housing costs in an aggregate price index

This section will first look at the weights that each of the approaches discussed above would have if they were to be used to measure owner occupiers' housing costs (OOH) alongside the existing Consumer Prices Index (CPI). This analysis includes the weights of the sub-component indices for each OOH approach as well as the approaches' total relative weight alongside the basket of goods and services included within CPI. For each approach, a contributions chart is presented which shows the experimental aggregate price index and the relative size of contributions from the OOH component.

A comparison of the different aggregate price indices using each of the approaches – CPI-H(NA) and 2 methods to calculate CPI-H(Payments) – are provided at the end of the section and compared with CPIH, which is the existing CPI basket plus the rental equivalence approach of measuring OOH.

For more information on the methodology and underlying concepts for each of the different approaches, please see the latest [Understanding the different approaches of measuring owner occupiers' housing costs \(OOH\)](#). Users should note that the payments approach and net acquisitions are both experimental indices and therefore we would caution against any use other than for research purposes. We are continuing to work on identifying possible improvements to the current methodology and data sources. Any changes to the indices will be highlighted in the future quarterly releases.

Payments approach

There are 2 different methods that we have used to calculate weights for the payments approach. This is because of a small disparity between the Retail Prices Index (RPI) and CPI total expenditure figures that arises because of a difference in data source. The RPI uses the Living Costs and Food Survey (LCF) as its main data source for its expenditure weights, while the CPIH and CPI use Household Final Consumption Expenditure (HHFCE) provided by national accounts.

The first method – CPI-H(Payments1) – calculates the majority of the sub-components using LCF data (as in the RPI). This method has a slightly lower total relative weight in the aggregate measure because of the small disparity between the RPI and CPI total expenditure figures. This is the method we have used in [previous articles](#) to calculate OOH(Payments).

The second method – CPI-H(Payments2) – attempts to account for this small disparity by reappportioning the RPI weights according to the CPI total expenditure. The method takes the expenditure ratio between the RPI and CPI total expenditure and multiplies the individual sub-component expenditure by this ratio. This up-scaled expenditure is then used to calculate the new expenditure weights for OOH(Payments2). While the differences are small, this method slightly reduces the contribution of stamp duty and major repairs and maintenance and increases the weight of the RPI components such as mortgage interest payments. The method has a higher total relative weight in the aggregate measure.

Tables 2a and 2b present the weights for 2 methodologies.

Table 2a: Weights for the sub-components of payments and total weight in CPI-H(Payments1) using the current methodology, 2005 to 2016

Year						%		Parts per thousand
	Mortgage interest payments	Council tax	Stamp duty	Major repairs and maintenance	Other		Weight in total CPI-H (Payments1)	
2005	40	31	6	13	10		110	
2006	39	31	7	14	10		108	
2007	42	30	7	12	9		111	
2008	43	28	9	10	10		118	
2009	34	33	11	12	11		98	
2010	32	37	7	15	10		87	
2011	31	39	5	16	10		86	
2012	28	40	7	15	9		85	
2013	28	42	6	16	9		84	
2014	30	42	6	14	9		83	
2015	31	42	5	13	10		81	
2016	28	41	9	13	10		84	

Source: Office for National Statistics

Note:

1. The weights of the individual sub-components may not sum to 100 due to rounding. To calculate the parts per thousand weight of a sub-component in the aggregate index, multiply the total weight by the sub-component weight (as a percent). For example, the parts per thousand weight of mortgage interest payments in 2005 is $0.40 \times 110 = 44$.

Table 2b: Weights for the sub-components of payments and total weight in the CPI-H(Payments2) using the reappportioning methodology, 2005 to 2016

Year	Mortgage interest payments	Council tax	Stamp duty	Major repairs and maintenance	%		Parts per thousand
							Weight in total CPI-H (Payments2)
2005	40	31	6	13	10		111
2006	40	31	6	13	10		112
2007	42	31	7	11	9		115
2008	43	28	9	10	10		121
2009	35	34	10	11	11		106
2010	33	37	6	14	10		94
2011	31	39	5	14	10		92
2012	29	41	7	14	9		91
2013	29	43	5	14	10		92
2014	31	43	5	13	9		89
2015	31	43	5	12	10		86
2016	29	41	8	12	10		88

Source: Office for National Statistics

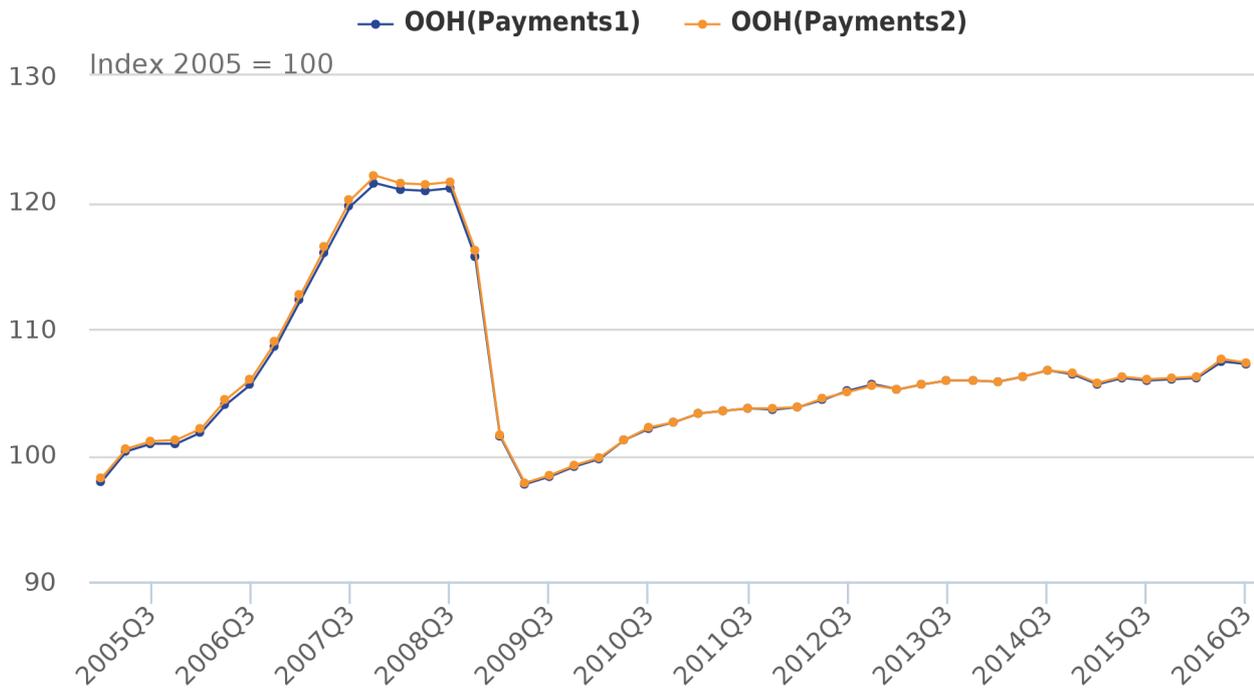
Notes:

1. The weights of the individual sub-components may not sum to 100 due to rounding. To calculate the parts per thousand weight of a sub-component in the aggregate index, multiply the total weight by the sub-component weight (as a percent). For example, the parts per thousand weight of mortgage interest payments in 2005 is $0.40 \times 111 = 44.4$

Figure 3 presents a comparison of the 2 OOH(Payments) indices calculated using the original methodology – OOH(Payments1) – and the reapportioned methodology – OOH(Payments2). As the weights are similar, the differences are small between the two series.

Figure 3: OOH (Payments1) and OOH(Payments2) indices, 2005=100

UK, Quarter 1 (Jan to Mar) 2005 to Quarter 3 (July to Sept) 2016



Source: Office for National Statistics

Notes:

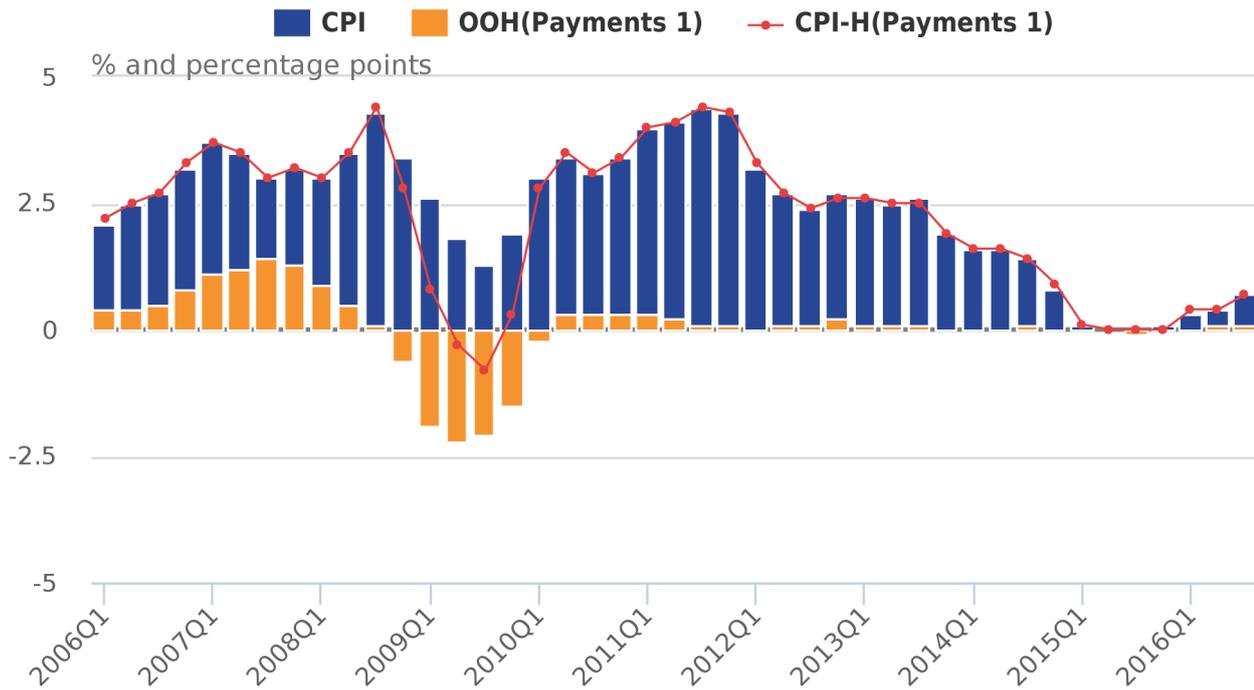
1. Q1 refers to Quarter 1 (Jan to Mar); Q2 refers to Quarter 2 (Apr to June); Q3 refers to Quarter 3 (July to Sept); and Q4 refers to Quarter 4 (Oct to Dec).

The growth rates for the experimental aggregate price indices using the 2 payments methods are presented in Figures 4a and 4b. The stacked bars represent the contributions to the growth rate from the OOH component compared with the other goods and services in the CPI basket.

For both methods, the stabilisation in interest rates since 2009 has meant that the OOH(Payments) component has contributed only slightly to the growth in the aggregate price index since the end of 2010, corresponding to its flat growth profile seen in Figure 2. The largest negative contributions came from the fall in the price of mortgage interest payments in 2009. This resulted in negative growth in both the aggregate price indices.

Figure 4a: Contributions to percentage change in CPI-H(Payments1) from OOH(Payments1) and CPI, latest quarter on corresponding quarter of previous year

UK, Quarter 1 (Jan to Mar) 2006 to Quarter 3 (July to Sept) 2016



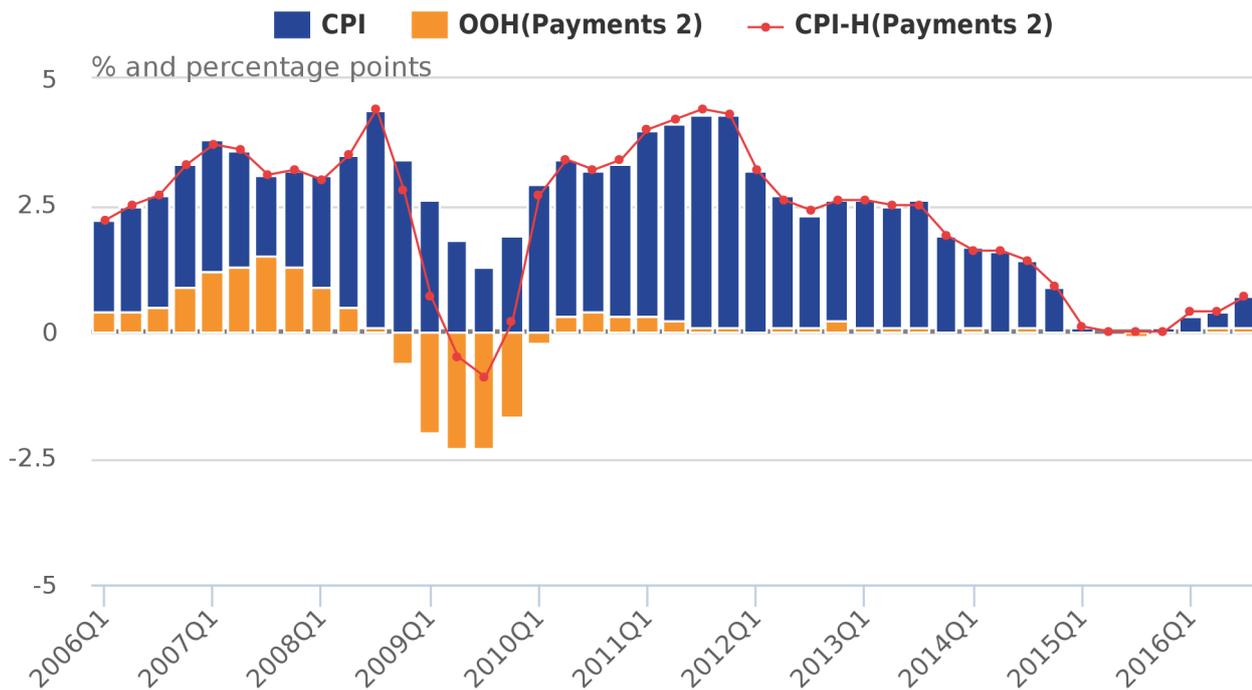
Source: Office for National Statistics

Notes:

1. Q1 refers to Quarter 1 (Jan to Mar); Q2 refers to Quarter 2 (Apr to June); Q3 refers to Quarter 3 (July to Sept); and Q4 refers to Quarter 4 (Oct to Dec).

Figure 4b: Contributions to percentage change in CPI-H(Payments2) from OOH(Payments2) and CPI, latest quarter on corresponding quarter of previous year

UK, Quarter 1 (Jan to Mar) 2006 to Quarter 3 (July to Sept) 2016



Source: Office for National Statistics

Notes:

1. Q1 refers to Quarter 1 (Jan to Mar); Q2 refers to Quarter 2 (Apr to June); Q3 refers to Quarter 3 (July to Sept); and Q4 refers to Quarter 4 (Oct to Dec).

Net acquisitions

Table 3 presents the weights used for the sub components of the net acquisitions approach and its relative weight in an aggregate measure of CPI-H(NA). While the measure presented here is the best measure of the net acquisitions approach that we can currently produce, the lack of available source data means that some components are not recorded fully. For instance, the methodology used does not separate between the land and house price, and therefore there will be some measure of asset price included in the approach, which in principle we would want to exclude from both the weights and price indices. There is also no available weighting information for “Existing Dwellings New to the OOH Sector”; therefore, a zero weight is currently applied. We therefore advise that OOH(NA) should be used and referred to with caution, and it is consequently not our favoured approach of measuring OOH. For more information about the methodology used to calculate the weights for OOH(NA), please see [the quarterly article](#).

Table 3: Weights for the sub-components of net acquisitions and total weight in the CPI-H(NA), 2005 to 2016

Year	New dwellings	Existing dwellings new to households	Other services related to the acquisition of dwellings	Major repairs and maintenance	Insurance connected with dwellings	Other services related to ownership of dwellings	% Parts per thousand	
							Weight in total CPI-H(NA)	
2005	57.9	0	23.1	14.6	4.4	0	100	
2006	60.3	0	23.1	14.5	2.1	0	104	
2007	64.6	0	20.9	12.7	1.8	0	104	
2008	61.8	0	24.8	11.3	2.1	0	106	
2009	60	0	25.8	11.9	2.3	0	99	
2010	65.1	0	16.8	15.5	2.6	0	84	
2011	63.9	0	15.5	17.8	2.8	0	76	
2012	63.4	0	17.3	16.5	2.8	0	80	
2013	66.1	0	15.2	16.6	2.1	0	79	
2014	65.5	0	17.7	14.7	2.1	0	78	
2015	66.4	0	17.8	12.3	3.5	0	82	
2016	66.6	0	20.4	10.7	2.2	0	97	

Source: Office for National Statistics

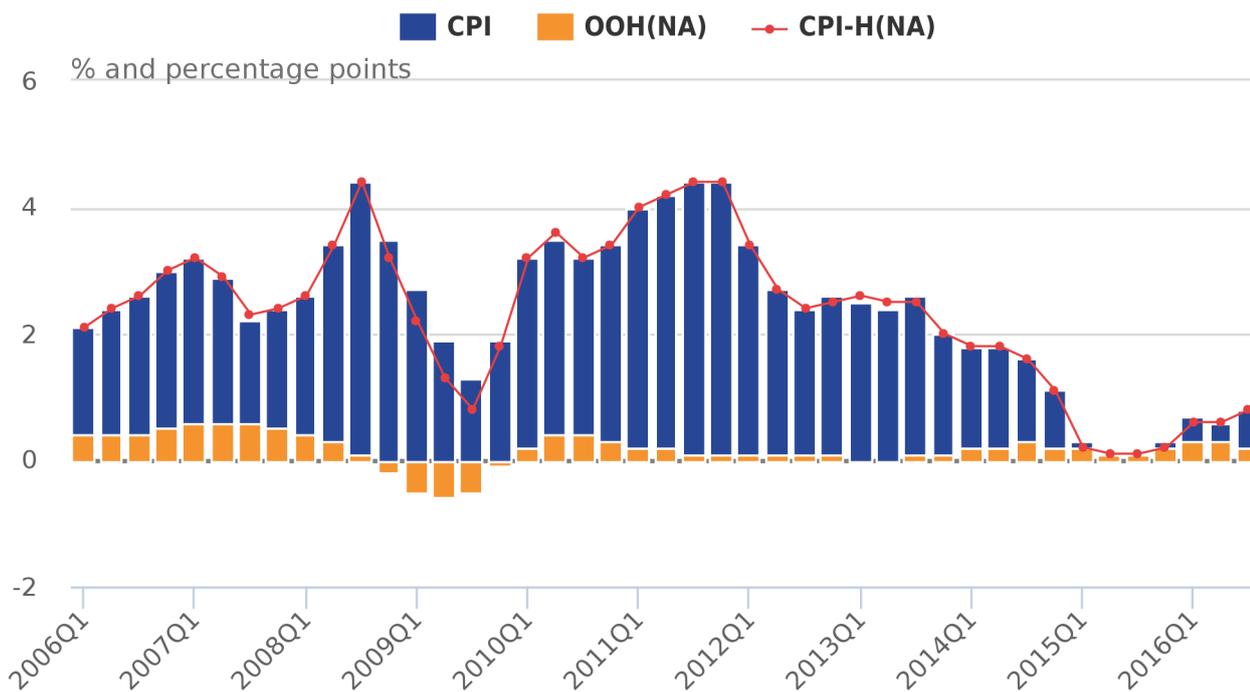
Notes:

1. The "other services related to ownership of dwellings" is based on the national accounts series 04.4.4 Other services relating to the dwelling and has zero expenditure recorded in Blue Book 2016. It therefore has a weight of 0 in the net acquisitions approach.
2. The sub-components for "other services related to the acquisition of dwellings" are stamp duty and transfer costs.
3. The weights of the individual sub-components may not sum to 100 due to rounding. To calculate the parts per thousand weight of a sub-component in the aggregate index, multiply the total weight by the sub-component weight (as a percent). For example, the parts per thousand weight of new dwellings in 2005 is $0.579 \times 100 = 57.9$.

The contributions to the experimental aggregate price index growth rate using the net acquisitions approach are presented in Figure 5. Negative contributions from the OOH(NA) component occur in the period Quarter 4 (Oct to Dec) 2008 to Quarter 4 2009. Contributions from OOH(NA) also fall towards the end of 2012. The [main driver of these changes](#) is the sub-component "New dwellings", which uses the House Price Index as its source data. These 2 periods of low or negative OOH(NA) contributions coincide with periods of negative or stagnating house price growth. One of the limitations of the net acquisitions approach is that movements in the asset price are not excluded from the index and can therefore influence some of the main trends shown in the data.

Figure 5: Contributions to percentage change in CPI-H(NA) from OOH(NA) and CPI, latest quarter on corresponding quarter of previous year

UK, Quarter 1 (Jan to Mar) 2006 to Quarter 3 (July to Sept) 2016



Source: Office for National Statistics

Notes:

1. Q1 refers to Quarter 1 (Jan to Mar); Q2 refers to Quarter 2 (Apr to June); Q3 refers to Quarter 3 (July to Sept); and Q4 refers to Quarter 4 (Oct to Dec).

Rental equivalence

The weights for the OOH(RE) approach used in CPIH are presented in Table 4, alongside the weights for OOH in CPI-H(NA) and the 2 aggregate payment measures. The weights for all approaches show a decline in the OOH expenditure share over time, which is in line with the fall in home ownership and the marked increase in private renting that has been seen since the start of the economic downturn ([Economic Review, April 2016](#)).

The weight for OOH in CPI-H(NA), CPI-H(Payments1) and CPI-H(Payments2) is lower than the weight of OOH in CPIH. For the payments approach, this is due in part to its methodology. Although the disparity between the CPI and RPI expenditure totals is small (which means that there is not much difference between the overall weight in CPI-H(Payments1) and CPI-H(Payments2)), there are further improvements that could be made. For example, we are currently investigating whether there are other data sources that collect expenditure data on the sub-components which are more in line with the HHFCSE scope and coverage compared with the LCF. For OOH(NA), the lack of available source data discussed above means that some components are not recorded fully. In particular, there is no available weighting information for “Existing Dwellings New to the OOH Sector”. However, even if there were some data available there is some discussion over whether this weight would indeed be negative: the existing owner-occupied dwelling stock has been falling since 2008 ([Dwelling stock, DCLG](#)). In general, as OOH(NA) is based on a “net” approach, we may expect that the expenditure weight would be lower than the weight for OOH(RE), which is calculated from expenditure on the ongoing consumption of housing services.

Table 4: OOH weights for the three approaches in CPIH, CPI-H(NA), CPI-H(Payments1) and CPI-H (Payments2), 2005 to 2016

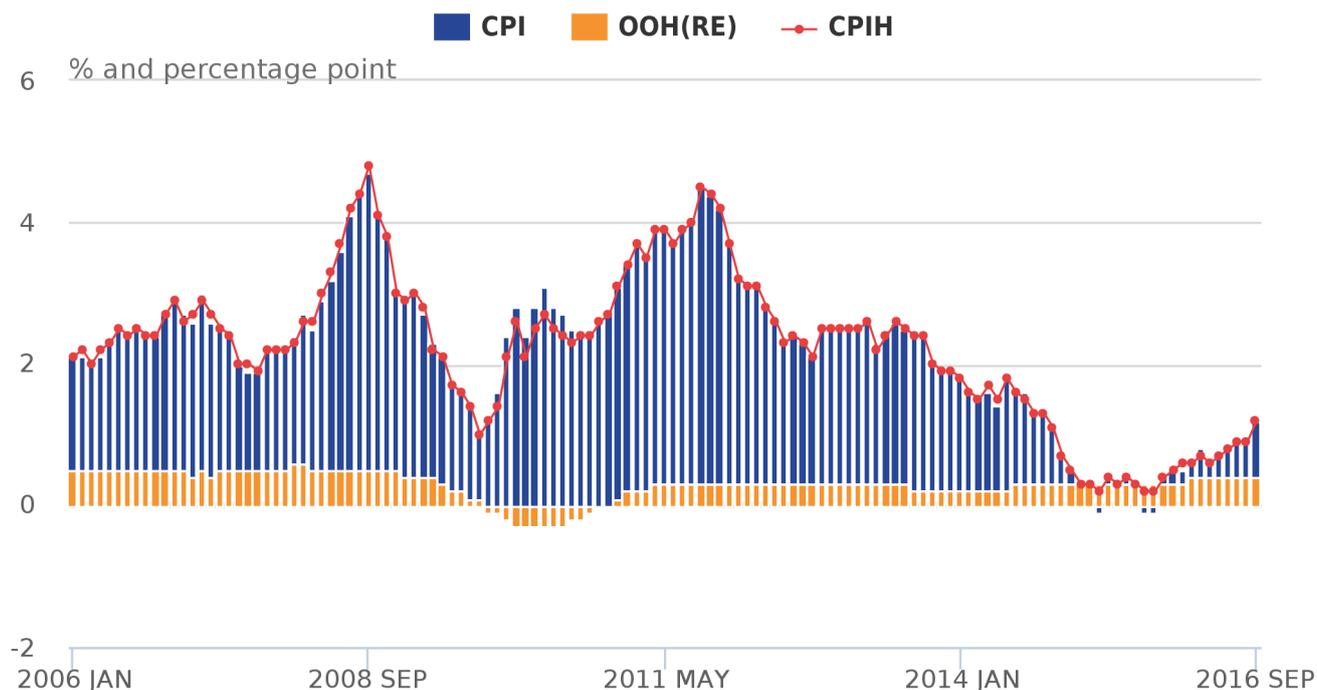
Year	Parts per thousand			
	Weight in total CPIH	Weight in total CPI-H (Payments 1)	Weight in total CPI-H (Payments 2)	Weight in total CPI-H (NA)
2005	195	110	111	100
2006	194	108	112	104
2007	197	111	115	104
2008	196	118	121	106
2009	184	98	106	99
2010	184	87	94	84
2011	184	86	92	76
2012	182	85	91	80
2013	179	84	92	79
2014	180	83	89	78
2015	178	81	86	82
2016	165	84	88	97

Source: Office for National Statistics

Figure 6 shows the contributions to the 12-month growth rate of CPIH from OOH(RE) and the other goods and services in the CPI basket. In the immediate aftermath of the economic downturn, contributions from OOH(RE) turned negative but for the rest of the time period contributions from OOH(RE) are fairly consistent at around 0.3 to 0.5 percentage points. Growth in the OOH(RE) component in 2015 offset the deflationary pressure from other goods and services in the CPI basket to a greater extent than the other 3 measures.

Figure 6: Contributions to percentage change in CPIH from OOH(RE) and CPI, 12-month growth rate

UK, Jan 2006 to Sept 2016



Source: Office for National Statistics

7 . Comparing the aggregate prices indices calculated using the different approaches

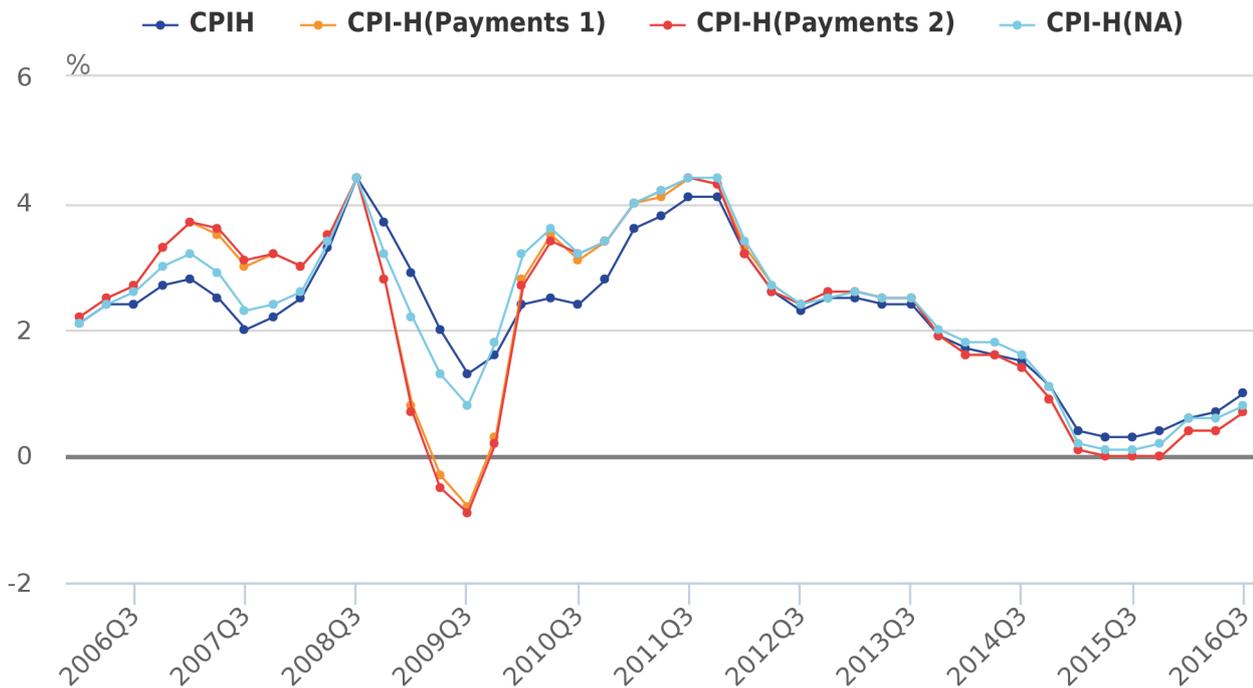
Figure 7 presents the growth rate for these aggregate price indices, CPI-H(Payments1), CPI-H(Payments2), CPI-H(NA) and CPIH, over the period Quarter 1 (Jan to Mar) 2005 to Quarter 3 (July to Sept) 2016.

The 4 approaches exhibit similar medium-run growth trends. However, the magnitudes of growth for several timeframes are substantially different. As noted previously, CPI-H(NA) appears to be heavily influenced by movements in house prices, in particular falling faster compared with CPIH in the immediate aftermath of the economic downturn and growing faster afterwards during the recovery of the housing market. The 2 payments methods exhibit similar movements but on a more substantial scale, demonstrating the impact of mortgage interest payments on the indices. In particular, the reduction of the Bank of England base rate in 2009 caused both the aggregate payments methods to turn negative in Quarter 2 (Apr to June) and Quarter 3 (July to Sept) 2009.

In recent periods, CPIH has had the highest growth rate. This may be due to the slowdown in growth of house prices since the beginning of 2015 affecting CPI-H(NA), as well as the stabilisation of monetary policy over the period since 2009. The recent cut in the Bank of England base rate in August 2016 may reduce the payments aggregate price index measure further in future.

Figure 7: CPIH, CPI-H(Payments1), CPI-H(Payments2), CPI-H(NA) growth rates, quarter on corresponding quarter of previous year

UK, Quarter 1 (Jan to Mar) 2006 to Quarter 3 (July to Sept) 2016



Source: Office for National Statistics

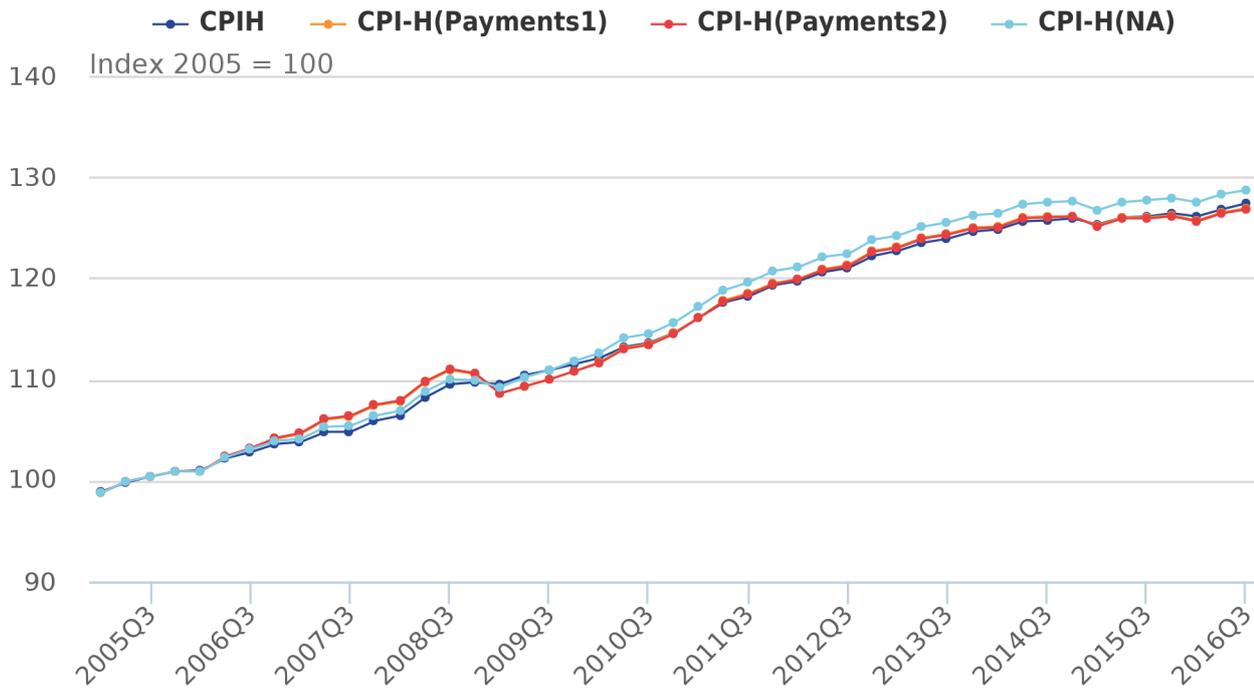
Notes:

1. Q1 refers to Quarter 1 (Jan to Mar); Q2 refers to Quarter 2 (Apr to June); Q3 refers to Quarter 3 (July to Sept); and Q4 refers to Quarter 4 (Oct to Dec).

The cumulative effect of all 4 approaches is presented in Figure 8. It suggests that since 2005, CPI-H(NA) has seen the highest growth of 28.7 percentage points over the period. The range between measures is small, however. CPI-H(Payments2), which has seen the lowest growth over the period, grew by 26.8 percentage points.

Figure 8: CPIH, CPI-H(Payments1), CPI-H(Payments2), CPI-H(NA) indices, 2005 = 100

UK, Quarter 1 (Jan to Mar) 2005 to Quarter 3 (July to Sept) 2016



Source: Office for National Statistics

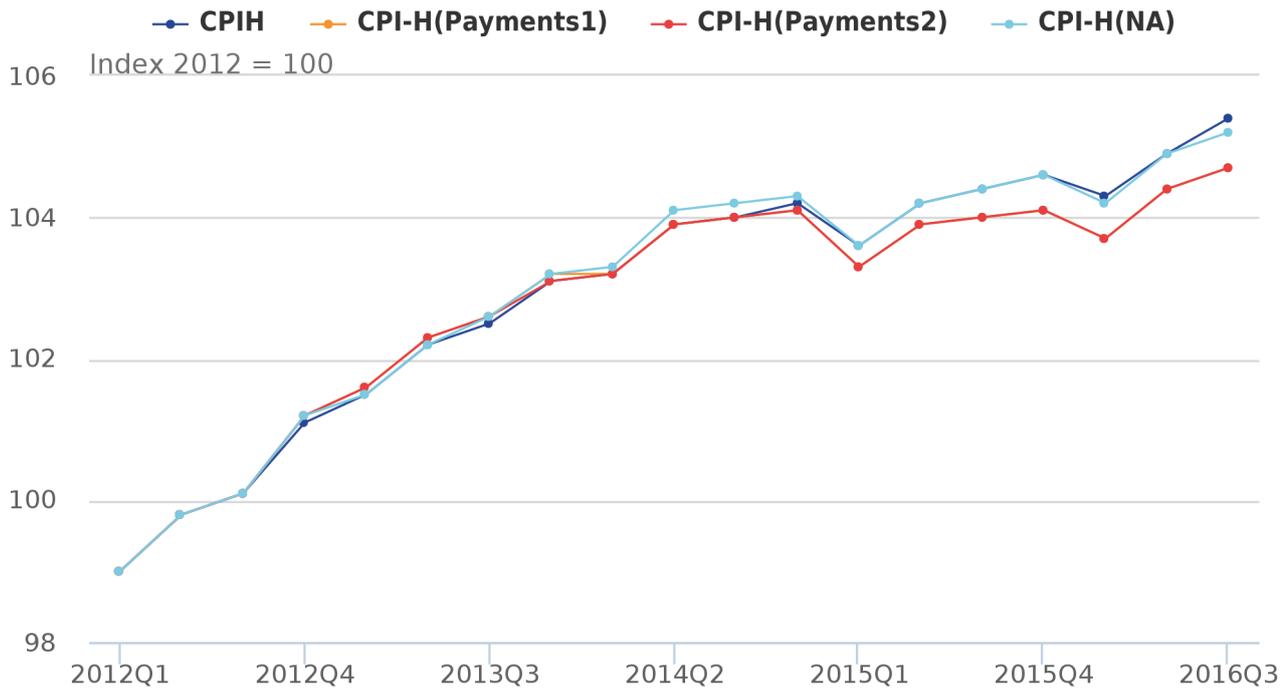
Notes:

1. Q1 refers to Quarter 1 (Jan to Mar); Q2 refers to Quarter 2 (Apr to June); Q3 refers to Quarter 3 (July to Sept); and Q4 refers to Quarter 4 (Oct to Dec).

Once we remove the impact of the economic downturn and its immediate aftermath, the range in differences between approaches over time becomes even smaller. Figure 9 presents the 4 aggregate price indices indexed to 2012. CPIH has seen the highest growth rate over the period, of 5.4 percentage points. However, the difference between CPIH and CPI-H(NA) is only 0.2 percentage points. The lowest measures – CPI-H (Payments1) and CPI-H(Payments2) – grew by 4.7 percentage points.

Figure 9: CPIH, CPI-H(Payments1), CPI-H(Payments2), CPI-H(NA) indices, 2012 = 100

UK, Quarter 1 (Jan to Mar) 2012 to Quarter 3 (July to Sept) 2016



Source: Office for National Statistics

Notes:

1. Q1 refers to Quarter 1 (Jan to Mar); Q2 refers to Quarter 2 (Apr to June); Q3 refers to Quarter 3 (July to Sept); and Q4 refers to Quarter 4 (Oct to Dec).

The annual average growth rates for each approach are given in Table 5. Since 2006, the average growth for all 4 approaches varies by 0.2 percentage points. If we look at the period since 2012, CPIH and CPI-H(NA) have the same average growth rate of 1.4%, compared with 1.3% for the 2 payments methods. The choice of method used within an aggregate price index therefore does not have much of an effect on the headline figure over time, although it can make a difference within individual years under certain economic conditions.

Table 5: Annual growth rates for the aggregate prices indices using different approaches of measuring OOH, 2006 to 2015

Year	CPIH	CPI-H(Payments1)	CPI-H(Payments2)	CPI-H(NA)
2006	2.4	2.6	2.7	2.5
2007	2.4	3.3	3.4	2.7
2008	3.5	3.4	3.4	3.4
2009	2	0	-0.1	1.5
2010	2.5	3.2	3.2	3.3
2011	3.9	4.2	4.2	4.3
2012	2.6	2.7	2.7	2.7
2013	2.3	2.4	2.4	2.4
2014	1.5	1.4	1.4	1.6
2015	0.4	0	0	0.2
Average ¹ : 2006 to 2015	2.3	2.3	2.3	2.5
Average: 2012 to 2015	1.4	1.3	1.3	1.4

Source: Office for National Statistics

Notes:

1. The average presented here is the compound average annual growth rate, which is a more appropriate measure of average growth over multiple time periods than the arithmetic average.