



The Value of UK Home Security

A Cebr report for Ring

June 2023

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London, June 2023

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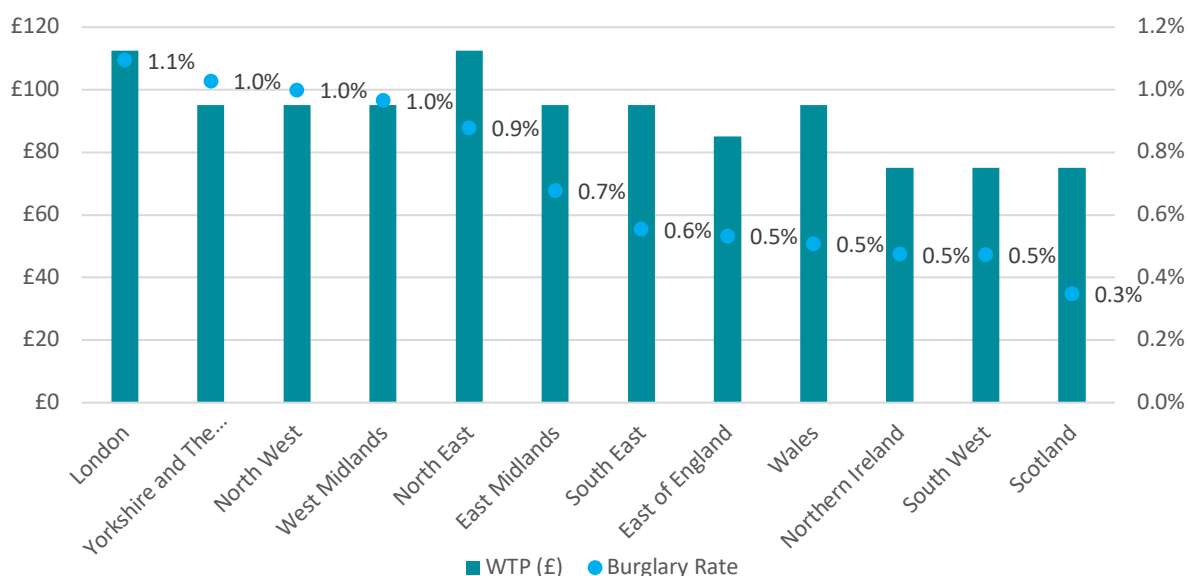
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Executive Summary

- The aim of this report is to place a value on the UK's home security economy and to analyse demographical variations, differences in attitudes and the incentives driving UK adult's investment in smart home security.
- The total social value that UK households place on perfect home security is approximately £2.7 billion.
- The average amount individuals are willing to pay annually for a guaranteed reduction of 100% in the likelihood of their home being burgled in the next 12 months is £95.
- Individuals living in London and in the North East have the highest willingness to pay at £113. Northern Ireland, the South West and Scotland have the lowest willingness to pay at £75.



Figure 1: For a guaranteed reduction of 100% in the likelihood of your home being burgled in the next 12 months would you pay an annual fee of £X? Regional breakdown



Source: 3Gem, Cebr analysis

- There is a positive correlation between the regional willingness to pay and regional burglary rates; namely, households in regions with higher burglary rates are willing to pay more for a reduction in the likelihood of their home being burgled.
- Individuals living in houses with a greater number of bedrooms, used as a proxy for property value, are typically willing to pay more for improved home security than those with fewer, all else being equal.

Some of the key demographic trends that we found were:

Men are more likely to own smart home security products (59.8% of those surveyed) than women (49.3%).

Individuals with children under 18 are more likely to own smart home security products (61.9%) than individuals living alone (46.9%).

Individuals who have home insurance are more likely to own smart home security products (61.9%) than people who do not have home insurance (40.1%).

- **The most popular driver of purchase of smart home security products was "peace of mind", listed by 42.3% of respondents. This was followed by "To feel safer when at home" listed by 39.6% of respondents, and "To act as a deterrent to burglary" which was listed by 30.0% of respondents.**

1. Introduction

1.1 Report Aims

Cebr was commissioned by Ring to produce a white paper report on the value people in the UK place on home security. The primary aims of this report are to place a value on the UK's home security economy, thereby providing a sense of the scale of the market, as well as highlighting and analysing demographical variations, differences in attitudes, and the incentives driving UK adults' investment in smart home security.

Ultimately, through an online survey of 2,000 UK adults conducted by 3Gem, we have been able to place a monetary figure on the social value that UK households place on home security.

1.2 Background Context

According to Social Value UK, Social Value is a broader understanding of value that moves beyond using money as the main indicator of value, instead putting the emphasis on people to understand the impact of decisions on their lives.¹ Specifically, within the context of home security, social value refers to the benefits that home security measures can bring to individual households, but also society as a whole. It extends beyond individual protection, or the value of assets within the home, and encompasses more holistic implications for communities and society. For example, the social value attributed to home security is not limited to monetary expenditure on smart home security devices. It also incorporates a broader ecosystem of values that includes factors such as the provision of public goods (e.g., taxes that pay for better policing or policies to improve crime more generally). Social value in this context is a holistic measure and some of the social benefits of home security include:

- **Peace of mind:** Home security systems can give homeowners peace of mind knowing that their property is protected. This can help reduce stress and anxiety, and improve overall mental health, quality of life, and potentially workplace productivity.
- **Community well-being:** When people feel safe (in their homes or otherwise), they are more likely to be involved in their local communities.² This can lead to stronger social ties and a more cohesive community.
- **Property values:** Homes in safe neighbourhoods tend to have higher property values because buyers are willing to pay more for a home in a safe area.³
- **Economic impact:** Beyond property values, safer neighbourhoods may also be conducive to enhanced economic growth and job creation. As an example,

¹ Social Value UK. (2023). 'What is Social Value.'

² Welsh Government. (2020). 'What factors are linked to people feeling safe in their local area?'

³ Ceccato, V., and Wilhelmsson, M. (2019). 'Do crime hot spots affect housing prices?'

creating strong and safe communities is one of the core objectives for Tower Hamlets' five-year vision for the prosperity of the borough.⁴

- **Crime prevention:** If home security systems can deter crime by making it more difficult for criminals to burgle or vandalise a property, this could help to reduce crime rates in neighbourhoods and communities. If crime rates are reduced, then an additional second-order benefit could be felt through reduced financial pressure on public resources, which may in-turn unlock previously inaccessible funding for other public goods and services.

⁴ Tower Hamlets Partnership. (2022). 'Tower Hamlets Plan (2018-2023): Annual Review, 2021-2022.'

2. Methodology

2.1 Nonmarket Valuation Methods

Nonmarket valuation is a methodology that is used to assign monetary values or assess the economic value that society attributes to goods and services that are not traded in traditional markets. Examples of nonmarket goods and services include biodiversity, the conservation of culturally significant tourist sites, clean air, or community cohesion.

The significance of nonmarket valuation arises from the fact that not all goods and services are directly bought and sold in markets. Therefore, their economic value is not tangibly reflected in market prices in the same way the cost of legal services or the price of a car is signalled by the market. However, just because a good or service is not traded within a market, it does not mean to say that it lacks economic, social, or environmental importance. Nonmarket valuation therefore allows economists and policymakers to quantify and incorporate these values into decision-making processes.

The Asian Development Bank suggests that nonmarket valuation is important because by generating monetary estimates that are easy for policymakers to understand, it helps to measure the trade-offs that individuals and governments are willing to make. Ultimately this helps promote the allocative efficiency of private and public resources.⁵

To examine the willingness to pay for home security across UK households, we would ideally analyse 'revealed preferences' using data on actual behaviour. Revealed preference theory suggests that if incomes and the item's price are held constant, the best indicator of preferences is purchasing habits or observed consumer behaviour. For example, if there are two goods, A and B, and an individual chooses to purchase A over B, then good A is considered 'revealed preferred' to B.

However, it is not always possible to directly observe purchasing habits, and as a result, the required consumer behaviour data does not always exist to elicit the revealed preferences of an individual or group.

In this study, we are attempting to estimate the social value that UK households place on home security. Since home security encompasses social values such as 'peace of mind' and the feelings of being safe at home, this is a non-market phenomenon where we cannot assess market data alone. In addition, utilising solely market data on the sale of home security products would be insufficient. As we see in the data from our survey, some respondents place a value on improved home security, but this value is likely lower than the price of many products in the market. Equally some respondents would pay more than the price of products in the market. In both of these instances, attempting to elucidate the value that individuals place on improved home security, through utilising solely sales data, would be an imperfect approach. Consequently, for the purposes of this study, we employ a *stated* preference willingness to pay methodology known as contingent valuation.

Within this report, we use the **contingent valuation method** to determine the value that UK households place on home security. This technique is a stated preference approach where

⁵ Asian Development Bank. (2021). 'Contingent Valuation of Nonmarket Benefits in Project Economic Analysis: A Guide to Good Practice.'

respondents are asked directly for their willingness to pay for a hypothetical change in the level of provision of a nonmarket good or service (in this case, **a reduction in the likelihood of being burgled**).

Table 1. Common elicitation formats for contingent valuation methods (with example question formats).

Elicitation Format	Example																																										
Open-ended	What is the maximum amount that you would be prepared to pay every year, to reduce the likelihood of your household being burgled by 100%?																																										
Bidding game	<p>Would you pay £500 every year, to reduce the likelihood of your household being burgled by 100%?</p> <p><i>If Yes: Interviewer keeps increasing the bid until the respondent answers No. Then maximum WTP is elicited.</i></p> <p><i>If No: Interviewer keeps decreasing the bid until respondent answers Yes. Then maximum WTP is elicited.</i></p>																																										
Payment card	<p>Which of the amounts listed below best describes your <i>maximum</i> willingness to pay every year to reduce the likelihood of your household being burgled by 100%?</p> <ul style="list-style-type: none"> • £0 • £1 • £2 • £5 • ... • £1,000 • £2,000 • £5,000 																																										
Single-bound dichotomous choice (SBDC)	<p>Would you pay £500 every year, to reduce the likelihood of your household being burgled by 100%?</p> <p><i>The suggested amount is then varied randomly across the sample.</i></p>																																										
Double-bound dichotomous choice (DBDC)	<p>Would you pay £500 every year, to reduce the likelihood of your household being burgled by 100%?</p> <p><i>If Yes: Would you pay £600?</i></p> <p><i>If No: Would you pay £400?</i></p> <p><i>The initial suggested amount is again varied randomly across the sample.</i></p>																																										
Multiple-bound dichotomous choice (MBDC)	<p>Which of the amounts listed below best describes your <i>maximum</i> willingness to pay every year to reduce the likelihood of your household being burgled by 100%?</p> <table border="1"> <thead> <tr> <th>Bid</th> <th>Definitely No</th> <th>Probably No</th> <th>Unsure</th> <th>Probably Yes</th> <th>Definitely Yes</th> </tr> </thead> <tbody> <tr> <td>• £0</td> <td>...</td> <td>...</td> <td>...</td> <td>...</td> <td>...</td> </tr> <tr> <td>• £1</td> <td>...</td> <td>...</td> <td>...</td> <td>...</td> <td>...</td> </tr> <tr> <td>• £2</td> <td>...</td> <td>...</td> <td>...</td> <td>...</td> <td>...</td> </tr> <tr> <td>• ...</td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>• £2,000</td> <td>...</td> <td>...</td> <td>...</td> <td>...</td> <td>...</td> </tr> <tr> <td>• £5,000</td> <td>...</td> <td>...</td> <td>...</td> <td>...</td> <td>...</td> </tr> </tbody> </table> <p><i>MBDC is similar to the payment card format other than the fact that respondents are asked about their degree of certainty of paying for each bid level.</i></p>	Bid	Definitely No	Probably No	Unsure	Probably Yes	Definitely Yes	• £0	• £1	• £2	• ...						• £2,000	• £5,000
Bid	Definitely No	Probably No	Unsure	Probably Yes	Definitely Yes																																						
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Source: Asian Development Bank, OECD, and Cebr analysis.

Due to its wide-ranging applicability and relative ease of use, this is a very popular technique, with the OECD noting that a search on the Web of Science for publications using the term “*contingent valuation*” produced almost 6,000 results as of 2017.⁶

Table 1 outlines several of the common elicitation formats that are used to assign monetary values to nonmarket outcomes.

Other than the MBDC approach, across each of the elicitation formats detailed above, they all ask for point estimates of an individual’s willingness to pay. In reality, and especially in hypothetical scenarios, it is highly unlikely that individuals can give precise preferences for changes in the provision of nonmarket goods. As a result, it can be highly advantageous to directly incorporate this uncertainty in each respondent’s valuation decision.

For the purposes of our study, we use a combination of the MBDC and the bidding game format to produce a questionnaire that maximised the advantages and minimised the disadvantages associated with each of the six options.

2.2 Survey Design

Used willingness to pay elicitation format

The bidding game format is advantageous because it gives respondents assistance to arrive at a WTP value, which can be difficult in relatively abstract or hypothetical scenarios; the streamlined choice process is seen to reduce the number of non-responses; and the iterative nature of the format can encourage respondents to consider their preferences carefully.

The main disadvantages of the bidding game format are that it is prone to starting point bias⁷; it can lead to many outliers; it is prone to “yea-saying”⁸; and repeated questioning may fatigue respondents leading them to try and finish the survey as quickly as possible.

To account for these disadvantages, we combined this approach with the MBDC format which has the advantage of reducing starting point bias by presenting a range of payment options. Furthermore, dichotomous choice formats are generally recommended, with the MBDC approach being the most appealing as it addresses the difficult in placing a single point-value on a hypothetical scenario.

Some academic evidence suggest, however, that the inclusion of five-or-more degrees of payment certainty⁹ is unnecessary and can add complication for the respondent as well

⁶ OECD. (2018). ‘Cost-Benefit Analysis and the Environment.’

⁷ Where the final WTP value at the end of the bidding game is systematically related to the initial bid value.

⁸ Yea-saying is the phenomenon where respondents indicate that they are willing to pay the specified amounts in order to avoid the socially embarrassing position of having to say no. As a result, they are seen to agree with increasing bids regardless of their true internal valuations. **The use of an online survey means that respondents are anonymous, limiting the degree of embarrassment.**

⁹ I.e., “definitely yes”, “probably yes”, “not sure”, “probably no”, and “definitely no” response options for each price.

as the data analyst.¹⁰ Therefore, we augment the traditional MBDC approach suggested in Table 1 by reducing the range of certainty options to just 'Definitely Yes', 'Definitely No', and 'Maybe'.

Survey fatigue associated with the bidding game is the main drawback with our approach. To directly address this, we took advantage of the online survey format and built in some reactive survey routing that used a respondent's answers to previous questions to inform the starting point for latter questions. This meant that there was not direct repetition of certain questions, and the survey time was shortened. Given this, plus the other advantages associated with the MBDC format, we viewed this as a reasonable trade-off for the survey.

Ultimately, our chosen approach was selected because it combines the statistical efficiency of the MBDC, while removing the potentially fatiguing and non-insightful 5-tiered approach. Beyond this, it accounts for uncertainty in the respondent's valuation decision; it limits starting point bias; it maximises statistical efficiency; and it is expected to suffer less from zero- or outlying-responses than a pure bidding game.

We looked to obtain a minimum and maximum 'definite' willingness to pay mark for each respondent. This would allow us to then interpret the mid-point between these two thresholds as each respondent's mean willingness to pay value.

Example questions

We examined participant's willingness to pay for the value you place on improved home security. To do this, we asked a set of hypothetical questions regarding each respondent's willingness to pay for home security improvements, as proxied by a decrease the likelihood of the respondent's home being burgled.

We use rate of burglaries as a proxy for overall home security primarily because the concept is relatively easy to understand, but also because it is one of the few quantifiable indicators that is directly linked to home security.

This approach requires us to ask respondents what they would be willing to pay, contingent on a specific change in circumstances. **We presented three hypothetical circumstances to the respondents: a 10% reduction in the likelihood of your home being burgled in the next 12 months, a 50% reduction, and a 100% reduction.** These equate to a "small improvement" in home security, a "substantial improvement" in home security, and "perfect home security". A benefit of asking three scenarios is that this allows us to assess whether differing percentage improvements played a role in households' willingness to pay estimates.

To help frame these hypothetical percentage changes, we asked respondents what they thought the likelihood of their home being burgled was in the next 12 months. From there, respondents were asked the following:

We want to understand the value you place on improved home security.

¹⁰ Vossler, C. (2003). 'Multiple bounded discrete choice contingent valuation: parametric and nonparametric welfare estimation and a comparison to the payment card.'

You said you thought there was a xx.x% chance of your house being burgled in the next 12 months.

For a guaranteed reduction of 10% in the likelihood of your home being burgled in the next 12 months would you pay an annual fee of £Y?

To obtain the minimum and maximum willingness to pay for each respondent under each scenario, we asked respondents to provide 'Definitely Yes' responses to ascending pound values until they were either unsure or responded, 'Definitely No'. This process was then repeated with descending pound values, with respondents suggesting 'Definitely No', until they were either unsure or responded, 'Definitely Yes'.

We were wary of the potential for fatigue with this bidding approach, therefore, to reduce the risk here we split the sample such that half of the respondents would be randomly assigned to the '10% scenario', and the other half to the '50% scenario'. All 2,000 respondents were asked the '100% scenario'. This meant that respondents were only asked two questions, rather than three.

Finally, after completing the above process, each respondent was shown a statistic from the ONS on the true likelihood of the average home being burgled.¹¹ As part of the demographic splits, we asked respondents which UK region they are based. The burglary rate statistic was shown for the same UK region where each respective respondent was based.

We did this to be able to account for potential biases that may have been generated through providing the true burglary statistics first. We asked each respondent to estimate the chance of their house being burgled in the next 12 months. The results shows that people consistently overstated the likelihood of being burgled, with the average response at 14.2%, compared to the true likelihood of 0.7%.



Even when we do have perfect information, it is often difficult to use this in the most appropriate way – especially in hypothetical or conceptually difficult to grasp scenarios. We found that differences in the optimal willingness to pay value were stable between the 'before' and 'after' responses. Given that the difference is marginal, but the latter are acting as more informed agents, **we exclusively present data for the responses given *after* true regional burglary statistics were presented to respondents.**

This above process was then repeated for each respondent, and if they were asked the '10% scenario' before being given the burglary statistic, they would again be asked the '10% scenario'. All 2,000 respondents were again asked the '100% scenario'. In total, respondents were asked four out of a possible six question sets.

Please note that throughout this report **we only present data for the responses given to the '100% scenario', after the burglary rate statistic was shown for the same UK region where each respective respondent was based.**

¹¹ In Scotland, burglaries are legally referred to as 'theft by housebreaking', however the data are equivalent to burglary rates observed across the rest of the UK.

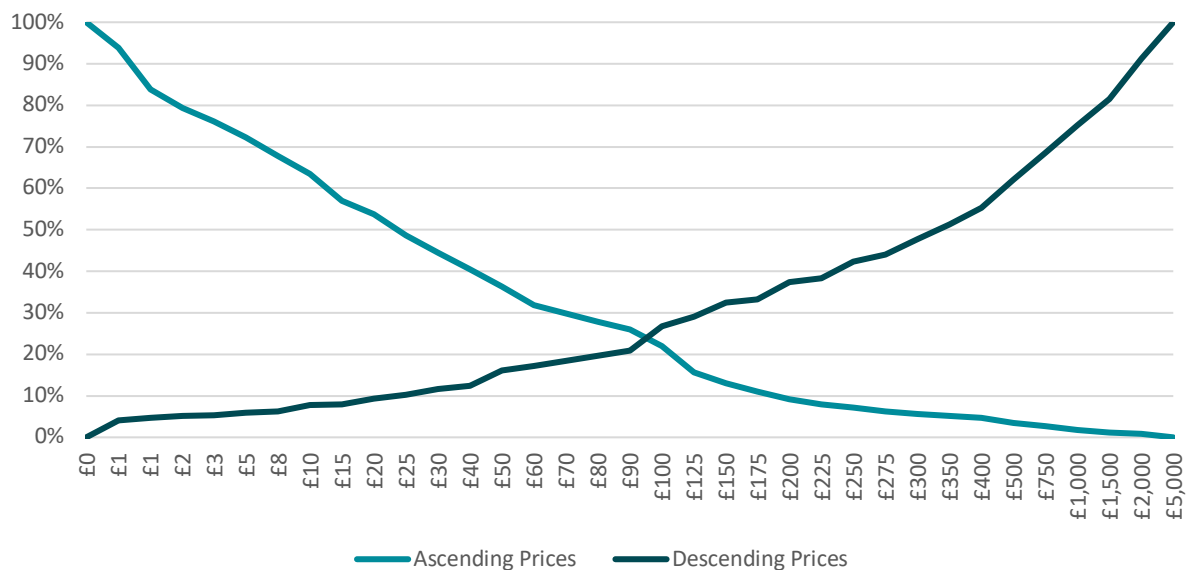
This is because the 100% scenario is conceptually the most simple and consistent to grasp, given that it is equivalent to ‘never being burgled again’. This outcome is the same for all respondents, whereas the ‘10%’ and ‘50%’ scenarios are less tangible and based on interrogation of the data, in our view are likely to have been inconsistently conceptualised. The additional data that was gathered was not deemed to provide substantial additional insight over and above the ‘100% scenario’. As a result, it has been omitted from the report.

Determining an individual's willingness to pay

We determine the optimal price point as the level at which maximises the number of people that are willing to pay a given price. Graphically, this is visualised as the point of intersection between the ascending and descending willingness to pay cumulative percentage distributions.

The graph below shows the cumulative percentage of respondents, when asked about their willingness to pay different pound values for a 100% reduction in likelihood of being burgled.

Figure 2. For a guaranteed reduction of 100% in the likelihood of your home being burgled in the next 12 months would you pay an annual fee of £X?



Source: Cebr analysis

The lighter coloured line shows proportion of respondents who answered ‘Yes, definitely’ to the respective pound values as they were displayed prices in ascending order. The line decreases from 100% at the minimum price point down to 0% (at the maximum price point of £5,000). As an example, approximately 80% of respondents were willing to pay £2, or put another way, 20% of respondents were ‘out’ at this level. As the prices increase, a greater share of individuals drop-out. For instance, only 50% of respondents were willing to pay £25, while less than 10% of respondents were willing to pay £200.

The dark blue line shows proportion of respondents who answered ‘No, definitely not’ to the same question, however in this instance they were shown prices in *descending* order.

The line decreases from 100% at the *maximum* price point of £5,000 down to 0% (at the minimum price point). For example, approximately 80% of respondents were NOT willing to pay £1,500, or put another way, just 20% of respondents were 'in' at this level. As the price level decreased, a greater share of the respondents were willing to pay the given values.

The point at which these two lines intersect is the optimal price point. This is the highest level of acceptance (in monetary terms) for respondents that were shown ascending prices *and* for respondents that were shown descending prices.

Specifically, at a price point of £90, when asking questions in ascending order. 26% of respondents were still 'in' and were willing to pay this value, but 74% were not. This means that we assume that only 26% of people would be willing to pay £90. However when asking the same question but starting at £5,000 and asking questions in descending order, 79% were 'out' by the time they reached £90 and only 21% were still in. Note that 'in' here means they would *not be willing* to pay £90.

The different approaches – starting high and counting down, compared to starting low and counting up – generate different figures. For methodological robustness, our aim is to attempt to capture a combination, or average, of the two. As we have a similar number of people who are willing and not willing to pay £90 when asking questions in descending and ascending order respectively, we deduce that £90 is close to the approximate price point.

However, slightly more people (26%) were willing to pay £90 when asking ascending price questions, than were not willing to pay £90 when asking descending questions (21%). At a price point of £100, the opposite is true. Therefore, the true willingness to pay is likely slightly higher than £90.

Utilising the same framework and logic but asking questions on respondents' willingness to pay £100, we get the opposite result. Asking questions at ascending price points, at £100, 22% of respondents were willing to pay £100 and 78% were not. However, asking descending questions 27% of respondents were not willing to pay £100 and 73% were. Therefore, the true willingness to pay is likely slightly lower than £100.

As in this example the 'crossing point' of the lines on the graph above is between the £90 and £100 questions, we assume that the willingness to pay of the sample is £95.

Demographic cross-breaks

Finally, as part of the survey, we also included a number of relevant demographic cross breaks. This has allowed us to present WTP values for difference subsets of the UK population and determine which factors play influence an individual's willingness to pay.

The demographic cross-breaks discussed in this report are:

- Geographic region
- Gender
- Age
- Living situation
- Income of chief earner in the household
- Number of bedrooms
- Home ownership and home insurance

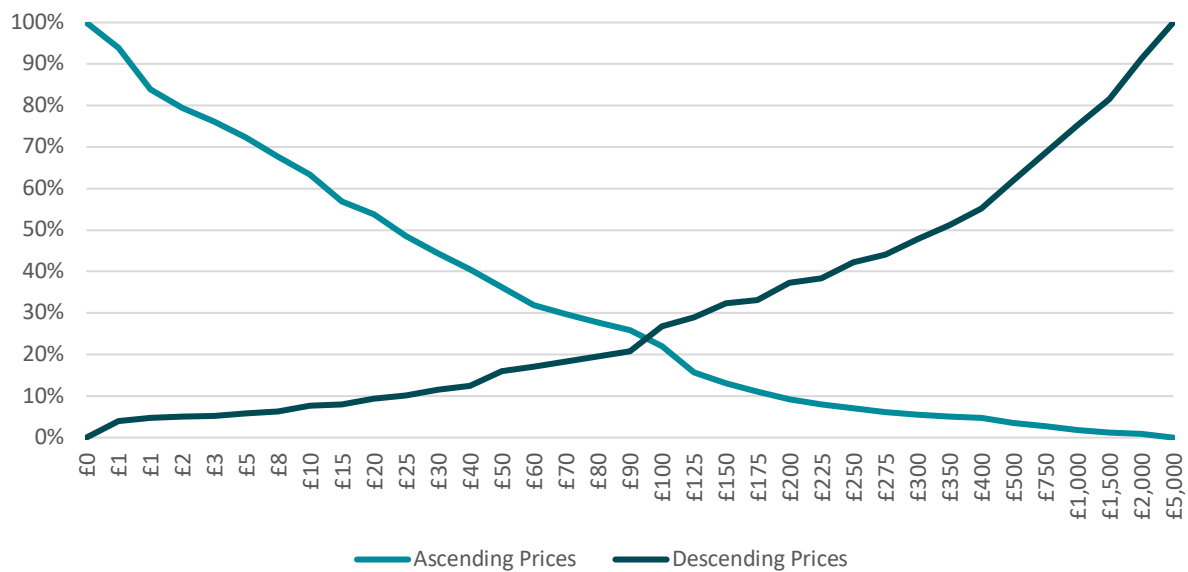
The demographic breakdowns are provided for both average willingness to pay (utilising the same methodology as set out above) and the sentiment analysis for the drivers and inhibitors of the purchase of smart home security products.

3. Findings

3.1 Headline Results

To quantify the social value that individuals place on improved home security, we estimate the average willingness to pay. Willingness to pay is a measure of how much an individual is willing to pay for a change in quality of a good or service. In this case, individuals are presented with a guaranteed improvement in their home security quantified by a reduction in the likelihood of their home being burgled.

Figure 3: For a guaranteed reduction of 100% in the likelihood of your home being burgled in the next 12 months would you pay an annual fee of £X? All respondents



Source: 3Gem, Cebr analysis

This graph shows that across all respondents the average amount individuals are **willing to pay annually for a guaranteed reduction of 100% in the likelihood of their home being burgled in the next 12 months is £95.**

To obtain the total social value that all UK households place on home security we multiply the obtained willingness to pay by the number of households in the UK, 28.1 million.¹² **The total social value that UK households place on perfect home security is approximately £2.7 billion.**



It is worth noting that while question regarding smart home security products were included in the survey, this analysis does not suggest that the referenced reduction in the likelihood of being burgled is necessarily linked to these products. Therefore, **the presented willingness to pay figures are not specifically related to smart home security devices but are to be interpreted as a more holistic measure of the social value that individuals place on home security overall.**

¹² ONS (2021). "Families and households in the UK: 2021"

Furthermore, the willingness to pay is not exclusively a function of the cost of the specific items that may be burgled. Rather, we anticipate that respondents are also pricing for the additional peace of mind that a 0% chance of being burgled will provide. For example, **Error! Reference source not found.** supports this by showing that ‘peace of mind’ and ‘to feel safe at home’ are the top two reasons for people purchasing smart home security devices.

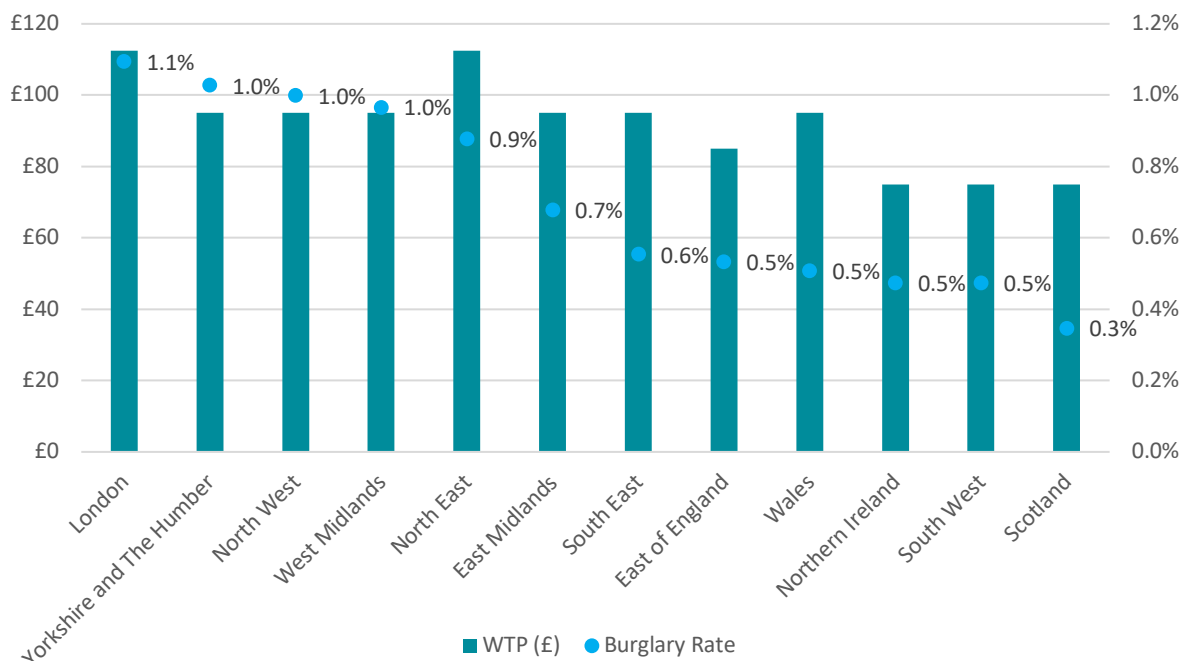
3.2 Demographic Analysis

Following on from the headline figure, we now present results broken down by a range of relevant demographics: region, gender, age, and household. We find that certain characteristics are correlated with higher willingness to pay values than others. For example, in this section, we will demonstrate that gender does not appear to be a major driver, however living with children under the age of 18 is. In addition, both region and age appear to be positively correlated with willingness to pay.

Further research is required to establish causal links; however, this trend analysis still provides insight into the decision-making process for different groups of the population.

Region

Figure 4: For a guaranteed reduction of 100% in the likelihood of your home being burgled in the next 12 months would you pay an annual fee of £X? Regional breakdown



Source: 3Gem, Cebr analysis

The graph presents the average willingness to pay of each household for a guaranteed full reduction in the likelihood of their home being burgled in the next 12 months, with results split by geographic region. Individuals living in London and in the North East have the highest willingness to pay at £113. Northern Ireland, the South West region, and Scotland have the lowest willingness to pay at £75.

We then cross-referenced the average willingness to pay of individuals in each region with the respective regional burglary rate per 1,000 households. The trend observed shows a

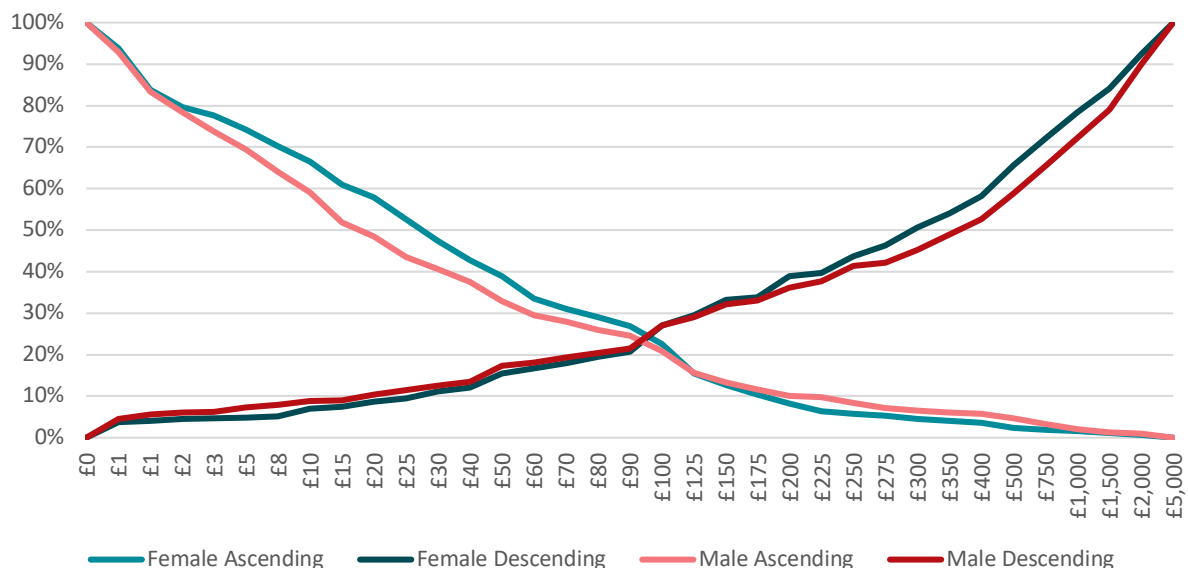
positive correlation between the regional willingness to pay and burglary rate; namely, individuals living in regions with a higher burglary rate exhibit a higher willingness to pay for a full reduction in the likelihood of being burgled.

The regional self-reported burglary rates are obtained as an average of the respondent's estimates of the likelihood of their home being burgled in the next 12 months asked in the survey. A self-reported burglary rate of 1% means that respondents in that region expect 1 in 100 homes to be burgled in the next 12 months.

There are, however, some potential outliers such as the North East, South East, and Wales where the average willingness to pay does not seem to follow the trend. However, these deviations may be due to other factors such as average regional incomes or differences in perceived burglary rate by region that lead to greater than expected willingness to pay values.

Gender

Figure 5: For a guaranteed reduction of 100% in the likelihood of your home being burgled in the next 12 months would you pay an annual fee of £X? Males versus females.¹³



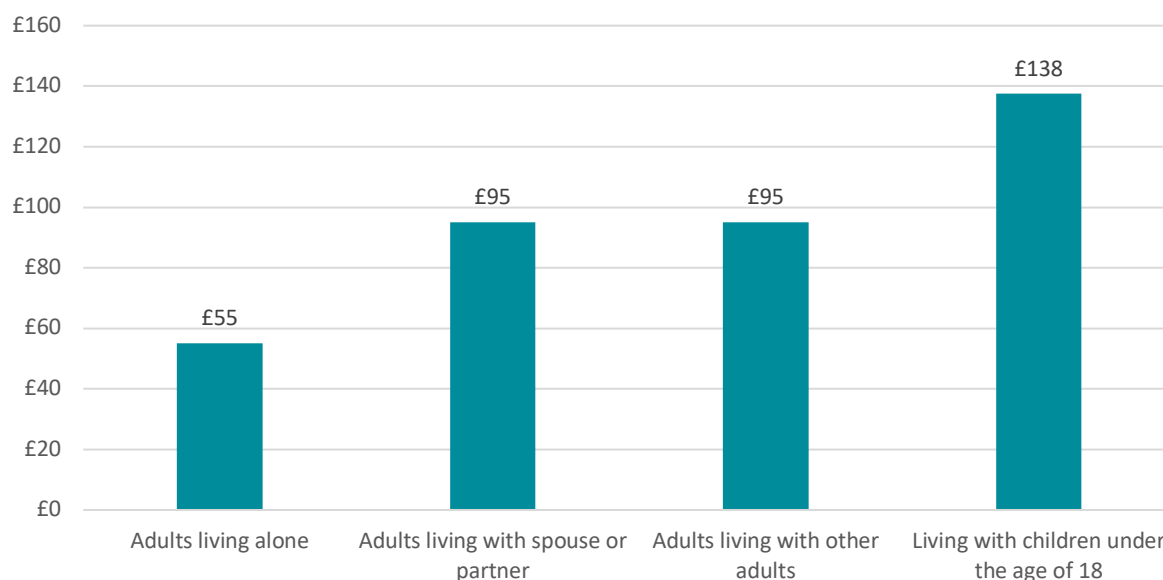
Source: 3Gem, Cebr analysis

The graph presents the average willingness to pay of male and female respondents. The ascending and descending lines for men and women are relatively similar and cross at the same optimal price point. This shows that there is little difference between the two groups with regards to willingness to pay. We estimate that both men and women would be willing to pay on average £95 for a guaranteed reduction of 100% in the likelihood of their home being burgled in the next 12 months.

¹³ Due to small sample sizes, data for other genders are not robust.

Living situation

Figure 6: For a guaranteed reduction of 100% in the likelihood of your home being burgled in the next 12 months would you pay an annual fee of £X? Living situation



Source: 3Gem, Cebr analysis

The graph presents the average willingness to pay of individuals with different living situations. We observe a clear trend where those living with children under the age of 18 have a far greater willingness to pay (£138), than households composed of exclusively adults (£95 if living with other adults; £55 if living alone).

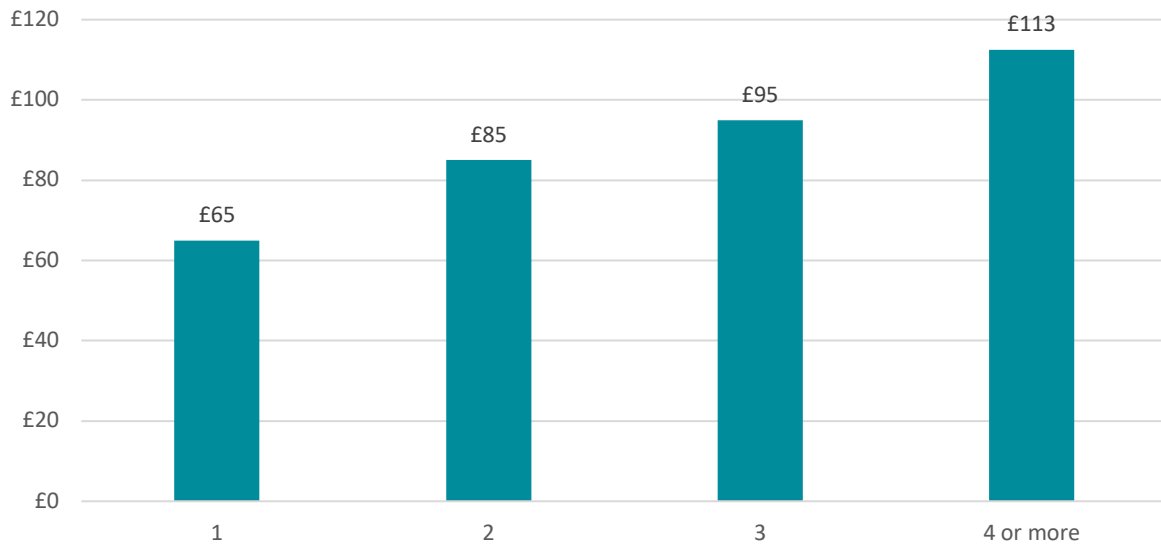
It is also worth noting that the low willingness to pay of those living alone may be affected by external factors beyond living situation. For example, we found that individuals living alone are more likely to be living in smaller house with fewer bedrooms. 65% of respondents who live in 1-bedroom properties live alone. 94% of respondents who live in a 4-bedroom property and 86% of respondents who live in a 3-bedroom property instead live with other people. As shown in the next section, the number of bedrooms in a property is positively correlated with a higher willingness to pay, suggesting that one of the reasons that people living alone have a lower willingness to pay is because they are also more likely to live in smaller properties with fewer bedrooms.

Individuals living alone were also more likely to be retired (7.7%) than individuals living with others (4.2%). As shown in later sections, retired respondents had a lower willingness to pay than individuals in other occupational categories. Furthermore, only 21.6% of individuals in higher managerial and professional roles and only 16.7% of individuals in intermediate managerial and professional roles, two categories with a high willingness to pay, live on their own. These trends help provide an explanation for the lower willingness to pay observed amongst individuals living alone.

Individuals over the age of 60 were more likely to be living alone than individuals between 30 and 59. Willingness to pay was observed to decrease with age which may once again explain why individuals living alone have a lower willingness to pay.

Number of bedrooms

Figure 7: For a guaranteed reduction of 100% in the likelihood of your home being burgled in the next 12 months would you pay an annual fee of £X? By number of bedrooms available in the household



Source: 3Gem, Cebr analysis

The number of bedrooms available in the household is used as a proxy for property value, given that, on average, homes with a greater number of bedrooms are typically worth more than those with fewer, all else being equal.

There are large house price variations across the country: for example, some 1-bedroom flats in parts of London will cost more than 2- or 3-bedroom houses across other regions. However, even without splitting this data further, we can see a clear trend that shows household willingness to pay increasing with the number of bedrooms, with respondents with four or more bedrooms willing to pay as much as £113.

Home ownership and insurance

Figure 8: For a guaranteed reduction of 100% in the likelihood of your home being burgled in the next 12 months would you pay an annual fee of £X? By property ownership¹⁴



Source: 3Gem, Cebr analysis

The above graph shows that individuals who own a property with a mortgage have a slightly higher willingness to pay at £113, than individuals who own outright and individuals who rent both at £95. However, the differences across these categories are not overly significant.

While the data are not presented graphically in this section, results from the survey find that individuals with home insurance have a higher willingness to pay at £95 than individuals without home insurance at £65.¹⁵ This may be because smart home security products such as video cameras may be useful to build an insurance claim in case of burglary. This may also be showcasing the revealed preferences of respondents that value home security who are therefore more willing to pay for an improvement in it and for home insurance.

Individuals who have home insurance are also more likely to have houses with more than 4 bedrooms (23.1%) than individuals without home insurance (11.5%). As previously shown, the number of bedrooms, used as a proxy for property value, has a positive effect on the average willingness to pay.

¹⁴ The sample size of shared ownership is only 30 respondents. However, all other categories have a sample size of at least 450 respondents and there is a total of 1,508 individuals covered in this graph.

¹⁵ There are 1216 respondents who have home insurance compared to about 273 who do.

Self-reported burglary rate

Figure 9: For a guaranteed reduction of 100% in the likelihood of your home being burgled in the next 12 months would you pay an annual fee of £X? By self-reported burglary rate

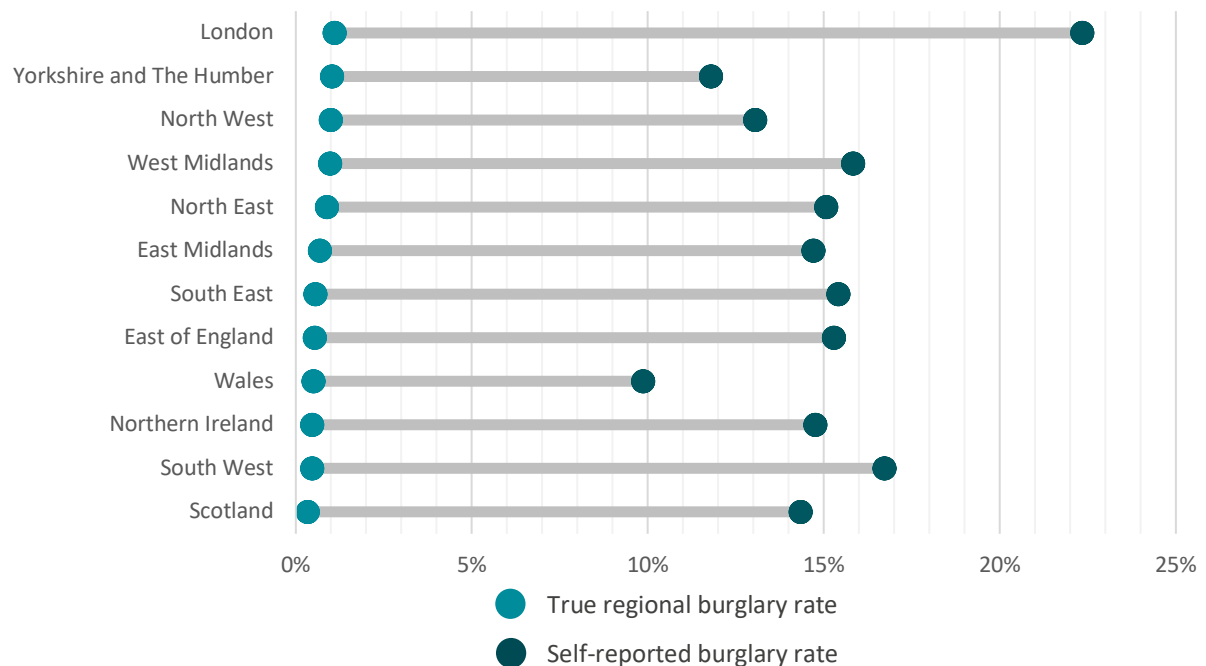


Source: 3Gem, Cebr analysis

As part of the survey, respondents were asked to estimate the likelihood of their home being burgled in the next 12 months. The average self-reported burglary rate was observed to have a large effect on individuals' willingness to pay as respondents with those making the highest estimates have a higher willingness to pay.

Generally, respondents overestimated the true likelihood of their home being burgled with 11.4% of respondents estimating the likelihood to be more than 50%. The average self-reported burglary rate was 17.2% compared to the true value of a which is 0.7% nationally. Despite many respondents overstating the true figure here, 24.4% of respondents estimated the likelihood of their home being burgled in the next 12 months to be less than 1% which is close to the true value.

Figure 10: Self-reported burglary rates versus actual burglary rate by region, rate per 1,000 households



Source: 3Gem, Cebr analysis

The largest overestimation occurred in London where the average self-reported burglary rate was 21.3% compared to the true regional value 1.1%. This is followed by the South West where the average self-reported burglary rate was 16.3% compared to the true regional value 0.5%. The closest estimation, although still inaccurate, occurred in Wales where the average self-reported burglary rate was 9.4% compared to the true regional value which was 0.5%.

Income

The following graph presents a relatively intuitive trend where, on the whole, those with greater incomes are willing, and most likely able, to pay more than those with lower incomes.

The only outlier observed in the graph below is within the £70,000 to £99,999 income bracket. The sample size in this group is as satisfactory as other income brackets so that should not be the cause of the problem. We conducted some further research to investigate if this group possesses a disproportionately high share of some of the other characteristics (region, living situation, self-reported burglary rate etc.) associated with lower willingness to pay. We were not able to find any trends amongst respondents in this group that explain their lower willingness to pay.

Figure 11: For a guaranteed reduction of 100% in the likelihood of your home being burgled in the next 12 months would you pay an annual fee of £X? By household gross annual income brackets



Source: 3Gem, Cebr analysis

Similarly, the same trend is observed when breaking down the data by social grade; namely by the occupation of the chief income earner in each household. Respondents in higher managerial and professional roles had the highest willingness to pay £213 followed by respondents in intermediate managerial and professional roles at £113. Students, homemakers, retired and unemployed respondents had the lowest willingness to pay at £45.

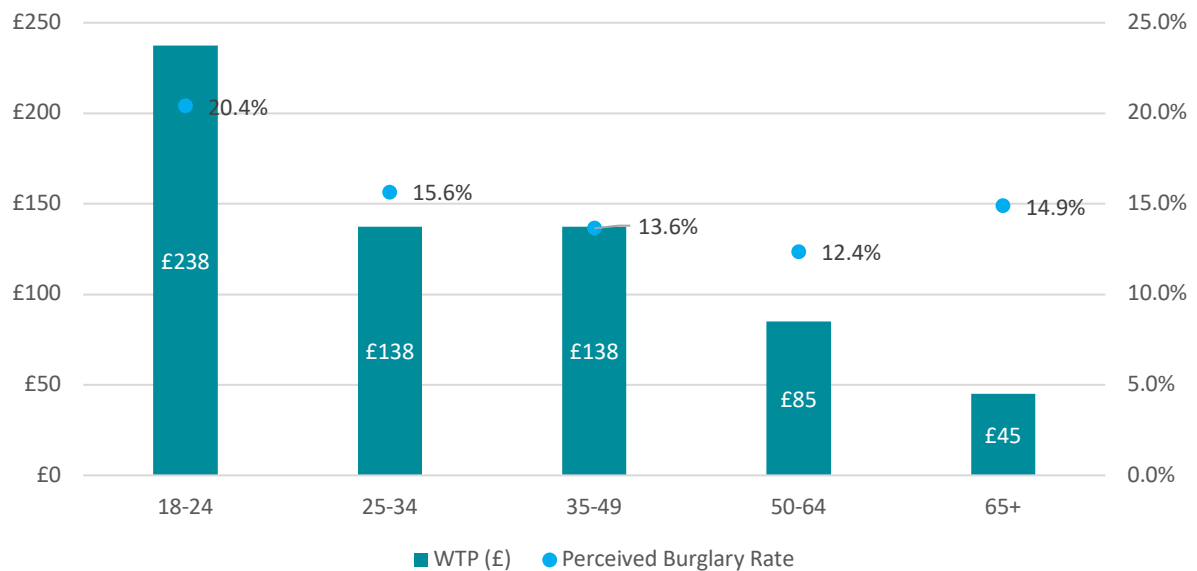
Figure 12: For a guaranteed reduction of 100% in the likelihood of your home being burgled in the next 12 months would you pay an annual fee of £X? By social grade



Source: 3Gem, Cebr analysis

Age

Figure 13: For a guaranteed reduction of 100% in the likelihood of your home being burgled in the next 12 months would you pay an annual fee of £X? Age brackets and self-reported burglary rate (per household)



Source: 3Gem, Cebr analysis

The graph presents the average willingness to pay of individuals in different age brackets. The results obtained suggest that individuals between the age of 18 and 24 have the highest willingness to pay at £238 while individuals over the age of 65 have the lowest willingness to pay at £45.

Initially, the fact that willingness to pay decreases with age may seem like a counterintuitive trend as income is usually expected to increase with age. However, as part of the survey respondents were asked to estimate the likelihood of their home being burgled in the next 12 months. From this were able to obtain the perceived burglary rates by individuals in each age bracket. As shows in the graph, individuals between the ages of 18 and 24 had the highest perceived burglary rate at 20.4%. As a result, it is likely that despite lower incomes, the higher perceived likelihood of burglaries by the youngest age group is driving the higher willingness to pay observed.

Overall, it is likely that this trend is not driven by age directly. Rather, other characteristics that are associated with lower willingness to pay values are likely to be related to the older age groups. One example of this is the above data on expected burglary rate. Beyond this, through our analysis we have found that retired individuals have a substantially lower willingness to pay (£45) than the national average (£95).

Furthermore, respondents without pets have a lower willingness to pay (£55) than respondents with pets (£113) and pet ownership was found to decrease for older generations. The average rate of pet ownership for respondents over the age of 60 was 59.4% compared to 71.5% for those younger than 60, according to the survey.

Ultimately, further research and the use of more advanced econometric techniques such as regression analysis may be beneficial to isolate the impact of any given explanatory factors. This example demonstrates the fact that while age is shown to have a strong correlation with willingness to pay for home security, it is likely that this is indirectly driven by external characteristics that are associated with being old or young, rather than inherently being any given age.

3.3 Sentiment Analysis

The aim of this section is to investigate which factors play a role in individual's decision to purchase or not purchase a smart home security device. This will also offer an insight into the benefits of smart home security products, such as sense of wellbeing and how they are valued by consumers.

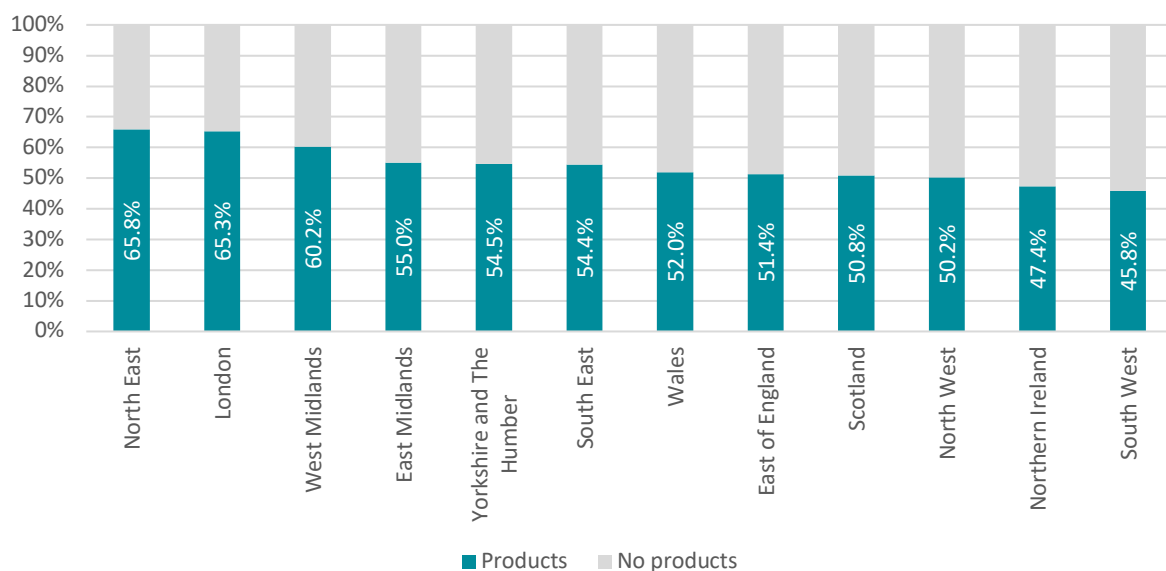
Smart home security device ownership

Before focusing on the specific factors, we provide an overview of the number of respondents who already own smart home security products in each demographic breakdown.

Overall, 55% of respondents stated they already own a smart home security product compared to 45% who do not.

Individuals living in the North East are most likely to own smart home security products (65.8%), followed by individuals in London (65.3%). Individuals in the South West are least likely to own smart home security products (45.8%).

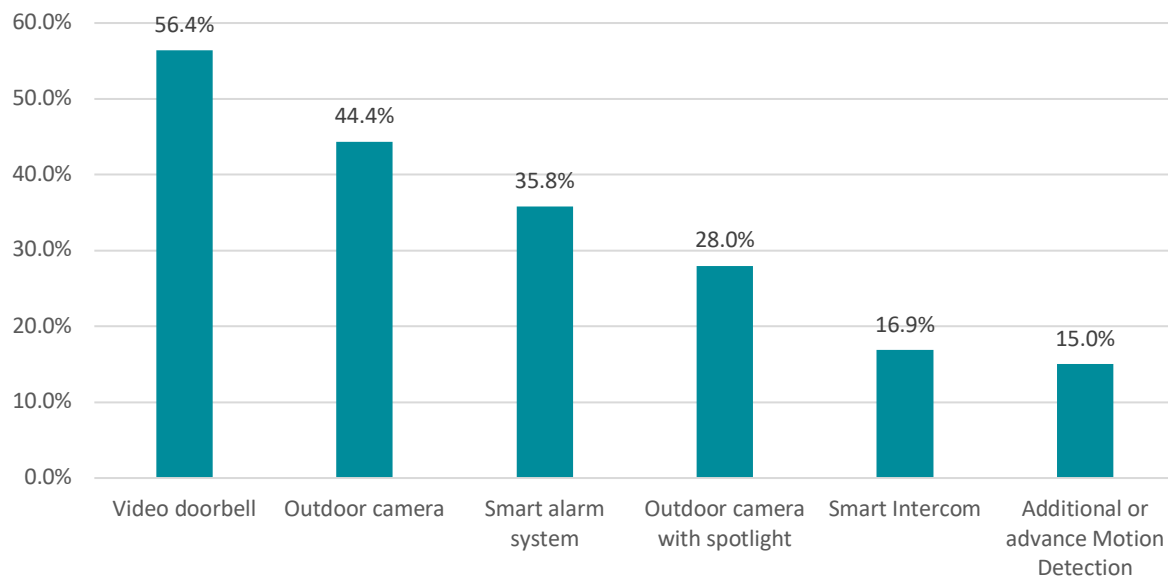
Figure 14: Percentage of respondents who own smart home security products by region



Source: 3Gem, Cebr analysis

The most popular smart home security products purchased by survey respondents were video doorbells and outdoor cameras.

Figure 15: Most popular smart home security devices amongst purchased by survey respondents.



Source: 3Gem, Cebr analysis

Some of the key demographic trends that we found were:

- Men were more likely to own smart home security products (59.8%) than women (49.3%).
- Individuals with children under 18 are more likely to own smart home security products (61.9%) than individuals living alone (46.9%).
- Individuals who have home insurance are more likely to own smart home security products (61.9%) than people who do not have home insurance (40.1%).

These trends align with the willingness to pay trend we observed in the previous section.

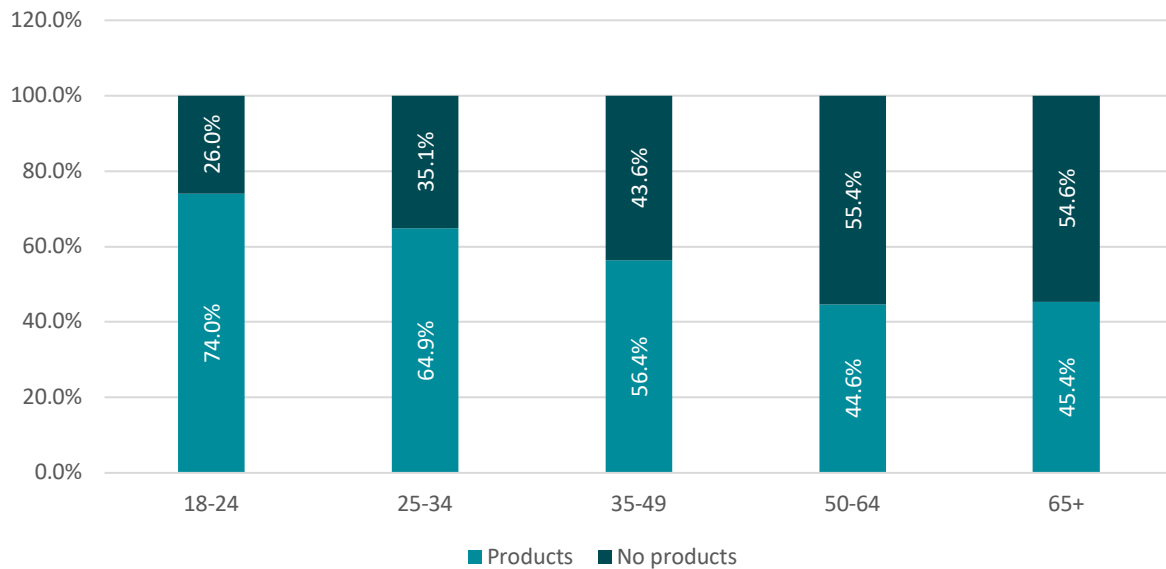
Table 2: Percentage of respondents who own a smart home security product by different demographic groups

	Percentage of respondents who own a smart home security product	Percentage of respondents who do not own a smart home security product
Female	49.3%	50.7%
Male	59.8%	40.2%
Living alone	46.9%	53.1%
Living with children under 18	61.9%	38.1%
Home insurance	59.0%	41.0%
No home insurance	40.1%	59.9%

Source: 3Gem, Cebr analysis

Individuals between 18 and 24 are most likely to own smart home security products (74.0%). Individuals between 50 and 64 are least likely to own smart home security products (44.6%).

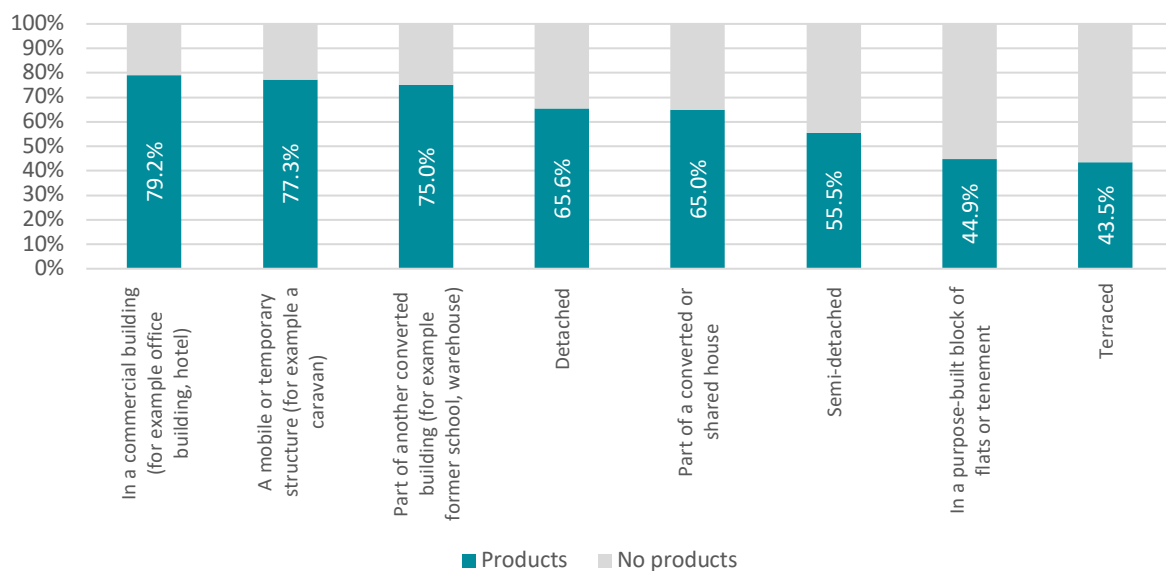
Figure 16: Percentage of respondents who own smart home security products by age brackets.



Source: 3Gem, Cebr analysis

Individuals living in commercial buildings are most likely to own smart home security products (79.2%). Individuals living in terraced houses are least likely to own a smart home security product (43.5%).

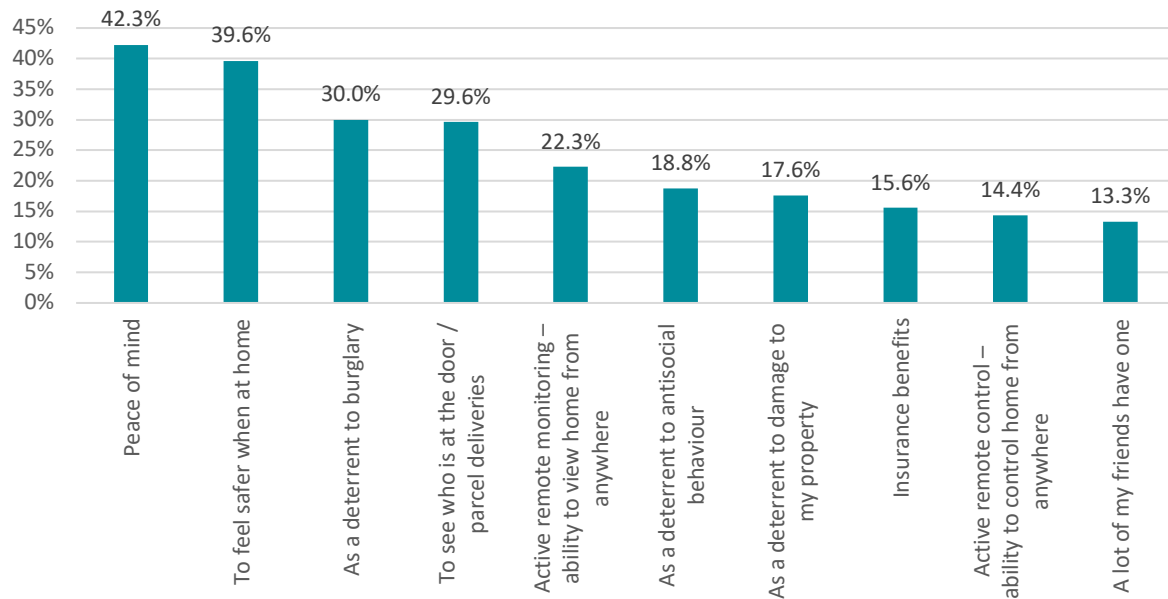
Figure 17: Percentage of respondents who own smart home security products by housing type



Source: 3Gem, Cebr analysis

The next part of the research aimed to identify the drivers of the purchase of smart home security products amongst respondents.

Figure 18: Most popular reasons for buying smart home security product(s)



Source: 3Gem, Cebr analysis

The most popular reason listed was “peace of mind” by 42.3% of respondents. This generally was the most popular reason amongst most demographic groups. The following table presents the percentage of respondents in each demographic group that listed the top three reasons “peace of mind”, “to feel safer when at home” and “as a deterrent to burglary” as the drivers of their purchase. Full details are provided in Table 3 within the Technical Appendix.

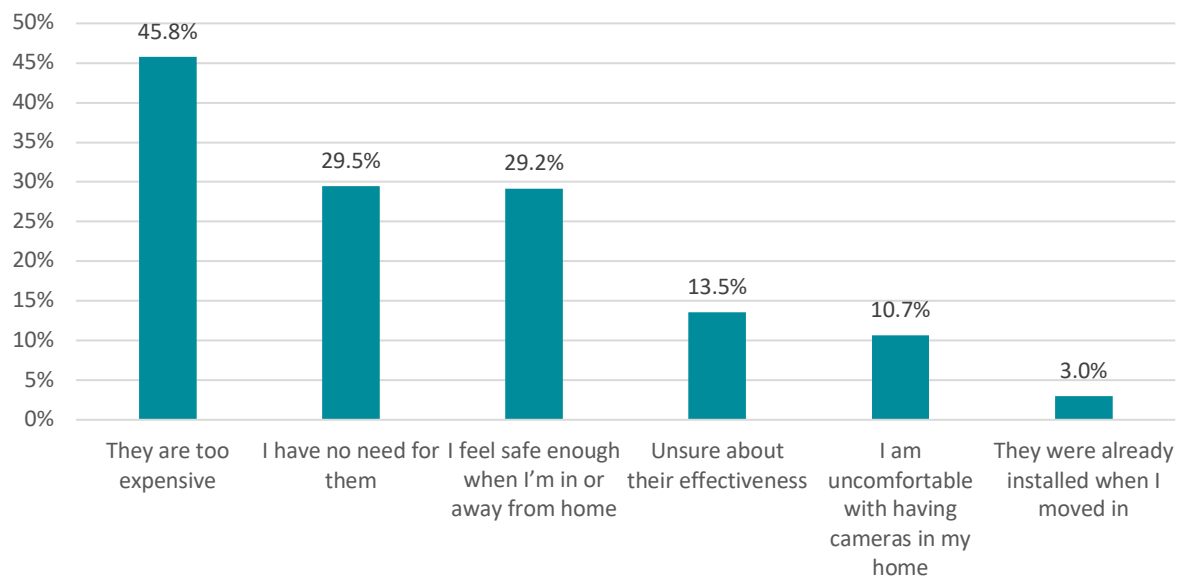
Overall, the reasons for purchasing smart home security products are similar across all demographic groups. Individuals over the age of 50 stated that they value peace of mind more than other age groups. Individuals over the age of 50 also valued the deterrence for burglary more than other age groups. People living in houses stated that they rely on these products to feel safer when at home more than people living in flats. Similarly, individuals living in houses valued the deterrence from burglary more than individuals living in flats.

Since respondents could select multiple options when asked about the reasons for purchasing a smart home security device, we observe a large overlap between the answers and therefore the willingness to pay value is relatively stable between groups.

The next part of the research aims to identify the reasons the reasons why respondents decided not to purchase any home security products.

Reasons for *not* buying smart home security devices

Figure 19: Most popular reasons for not buying smart home security product(s)



Source: 3Gem, Cebr analysis

The most popular reason for not purchasing these products was that they are too expensive (45.8%). 29.5% of respondents stated that they have no need for these products while 29.2% of respondents stated that they feel safe enough when they are in or away from home.

Male respondents are less likely to purchase smart home security products as they feel safer at home than female respondents. Individuals in the 35-49 and 50-64 age brackets were more likely to not purchase smart home security products as they felt they are too expensive. Individuals living alone stated that they have no need for these products at a higher rate than individuals with children and that they feel safe enough suggesting that having children may be a driver for the purchase of smart home security products. Individuals living in East and West Midlands had the most respondents stating that they already feel safe at home. Full details are provided in Table 4 within the Technical Appendix.

Respondents between 35-49 years and 50-64 years stated that they considered smart home security products to be "too expensive" at a higher rate than other age brackets. This is generally in line with their willingness to pay which is lower than the younger age brackets.

Respondents in Northern Ireland and the North West stated that they considered smart home security products to be "too expensive" at a higher rate than respondents in other regions. This is generally in line with their willingness to pay which is lower than other regions.

4. Discussion

In this research, we have attempted to quantify the monetary value that UK households place on home security. Using a nationally representative survey, we have found that the total social placed on perfect home security by the 28.1 million UK households is approximately £2.7 billion. Beyond this, we have highlighted some of the variations in average household willingness to pay across key demographic groups.

The methodological approach taken was a contingent valuation, willingness to pay study. This has been successful in allowing us to place a monetary figure on a non-market service such as perfect home security. While the approach has been effective, there are some generalised limitations of this approach.

For example, no contingent valuation method is perfect, and all come with some drawbacks. We aimed to mitigate these limitations, but many factors such as hypothetical bias¹⁶ and the fact that respondents might limit their stated willingness to pay to the listed values, are unavoidable.

One of the main disadvantages of the bidding game format specifically was that repeated questioning may annoy, tire, or bore respondents, causing them to say "yes" or "no" to a stated amount in hopes of terminating the interview, resulting in less accurate WTP results.

As previously mentioned, we attempted to correct for this by taking advantage of the online survey format and building in some advanced coding that used a respondent's answers to previous questions to inform the starting point for latter questions. This meant that there was not direct repetition of certain questions, and the survey time was shortened. However, we did still find some evidence of respondents wanting to terminate the interview in as few clicks as possible. In these cases, we removed the responses from the sample.

We also found some evidence of logically inconsistent responses. This is where respondents gave answers in the 'ascending prices' section and the corresponding 'descending prices' section that were not compatible. For example, one respondent suggested that they would not be willing to pay £80 but that they would be willing to pay £100 for the same reduction in the likelihood of being burgled. In these instances, we also removed the responses from the final sample.

Ultimately, out of a sample of 2,000, we had approximately 1,500 valid responses. This did not adversely affect the robustness of the data used to produce the headline figures – there was still more than 50 responses in each of the main UK regions (where 50 is the minimum recommended threshold for this research).

Finally, it is important to note that we are not suggesting that buying smart home security products will lead to a guaranteed improvement in home security, nor will it lead to a reduction in the likelihood of being burgled. We use rate of burglaries as a more tangible proxy for the wider, and more holistic concept of home security.

¹⁶ Hypothetical bias is the difference between hypothetical statements of value versus actual payments.

We were unable to find a consensus in the literature that owning smart home security devices reduced the chances of being burgled, and we recommend that further research is needed to assess this relationship.

However, this is not the aim of our study. We are assessing home security in more general terms, where people purchasing smart home security devices may provide some comfort or peace of mind to households. Put another way, smart home security devices are just one part of the broader social value that we attribute to feeling safe at home.

5. Technical Appendix

5.1 Data tables

Table 3: Main drivers of purchase of smart home security products for different demographic groups

	Peace of mind	To feel safe when at home	As a deterrent to burglary
Female	42.6%	41.2%	31.0%
Male	42.0%	38.0%	28.8%
<18 years	45.0%	45.0%	35.0%
18-24 years	33.5%	31.4%	13.1%
25-34 years	40.0%	44.3%	30.3%
35-49 years	40.6%	39.9%	31.0%
50-64 years	48.8%	45.6%	36.7%
65+ years	47.4%	30.8%	36.8%
Living alone	31.9%	9.3%	14.3%
Living with children under 18	33.9%	9.0%	18.6%
Scotland	42.7%	34.4%	25.0%
Northern Ireland	33.3%	25.9%	40.7%
Wales	44.2%	50.0%	30.8%
South West	41.5%	30.5%	15.9%
West Midlands	49.5%	42.7%	35.9%
North West	44.6%	39.3%	37.5%
North East	42.3%	46.2%	28.8%
Yorkshire and the Humber	43.3%	37.8%	37.8%
East Midlands	37.8%	34.1%	22.0%
East of England	34.8%	35.9%	33.7%
South East	46.3%	49.0%	32.7%
London	39.1%	39.7%	24.4%
Living in a detached house	48.9%	39.5%	34.4%
Living in a semi-detached house	43.8%	45.3%	33.2%
Living in a terraced house	50.9%	43.9%	28.1%
Living in a purpose-built block of flats or tenement	30.9%	33.1%	25.7%
Living in a flat part of a converted or shared house	31.3%	26.9%	19.4%
Living in a flat part of another converted building	15.2%	15.2%	24.2%
Living in a commercial building	21.1%	26.3%	10.5%
Living in a mobile or temporary structure	47.1%	23.5%	23.5%

Source: 3Gem, Cebr analysis

Table 4: Main reasons respondents did not purchase smart home security product(s)

	They are too expensive	I have no need for them	I feel safe enough when I'm in or away from home
Female	49.5%	25.6%	26.0%
Male	40.9%	34.4%	33.4%
<18 years	31.3%	43.8%	18.8%
18-24 years	40.3%	25.4%	23.9%
25-34 years	39.0%	31.0%	28.0%
35-49 years	49.3%	25.3%	21.2%
50-64 years	47.9%	28.7%	29.2%
65+ years	43.8%	36.3%	43.1%
Living alone	40.8%	38.8%	34.5%
Living with children under 18	51.0%	22.2%	26.8%
Scotland	34.4%	44.1%	23.7%
Northern Ireland	56.7%	36.7%	36.7%
Wales	41.7%	35.4%	31.3%
South West	46.4%	28.9%	37.1%
West Midlands	47.1%	17.6%	32.4%
North West	54.1%	26.1%	28.8%
North East	51.9%	29.6%	18.5%
Yorkshire and the Humber	42.7%	24.0%	28.0%
East Midlands	43.3%	23.9%	34.3%
East of England	51.7%	19.5%	28.7%
South East	45.5%	36.6%	27.6%
London	39.8%	31.3%	21.7%
Living in a detached house	40.7%	29.7%	31.0%
Living in a semi-detached house	48.7%	29.7%	29.3%
Living in a terraced house	57.2%	24.8%	27.5%
Living in a purpose-built block of flats or tenement	37.1%	38.9%	31.1%
Living in a flat part of a converted or shared house	30.6%	33.3%	27.8%
Living in a flat part of another converted building	45.5%	45.5%	9.1%
Living in a commercial building	60.0%	0.0%	0.0%
Living in a mobile or temporary structure	40.0%	20.0%	60.0%

Source: 3Gem, Cebr analysis

