



The Impact of E-commerce on Consumers in Ireland

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Executive Summary

The Irish e-commerce market is experiencing a period of rapid growth, with consumer spending estimated to have hit €5 billion in 2024. This expansion is being fuelled by increasing consumer preferences for shopping online, further accelerated by recent economic shocks such as the COVID-19 pandemic and subsequent high inflationary environment.

Existing literature identifies several channels through which consumers can benefit from online shopping. A greater reach to retailers, and lower costs associated with online platforms, can foster a more competitive retail environment. This can both place downward pressure on prices and expand the choice available to consumers. Moreover, the ease of accessing digital marketplaces, coupled with greater information and transparency online, can reduce the time and effort required to find and compare a vast array of products, brands or prices. These benefits may ultimately serve to increase the convenience of shopping, further empowering consumers to make better or more informed decisions when buying goods.

Recognising the lack of specific evidence on the impact of e-commerce in Ireland, this study aims to explore how online shopping affects consumers, particularly in terms of price dynamics and evolving consumer habits and preferences. To do so, the study employs a three-pronged methodological approach. Firstly, it gathers new and representative consumer insights through a dedicated survey in the Republic of Ireland. Secondly, it conducts an econometric analysis to examine the relationship between the increase in e-commerce use and price levels. Finally, the study develops a bespoke online price index to track and assess price trends within the Irish e-commerce landscape.

The analysis' findings are consistent with the negative or 'disinflationary' impact of online shopping on prices. Estimates from long-run analysis across the Eurozone suggest that a 1 percentage point increase in e-commerce penetration is associated with a 0.05-0.06 percentage point fall in annual inflation. Supporting evidence was also found by an Ireland-specific analysis, which used data from 2019 – 2024. The analysis estimated that a 1 percentage point increase in retail turnover generated online is associated with a 0.03-0.06 percentage point decrease in annual inflation. The Ireland-specific findings are subject to caveats due to the time period of the data available, which the analysis tried to address with robustness checks. Its estimates imply that over the last 5 years, prices have grown 1.2% less due to e-commerce use.

Further analysis of online prices, developed from Irish online purchase data, reveals a lower rate of price increase compared to domestic inflation, particularly for categories of goods such as clothing and footwear. These findings suggest households are deriving benefits from their use of online shopping to maintain their purchasing power amidst a period of increasing prices.

Beyond price-related benefits, the survey revealed that convenience emerges as a dominant theme for Irish consumers when shopping online. Almost three quarters (73%) of online shoppers appreciate the time and effort saved compared to in-store shopping. Key convenience factors cited include the ability to shop at any time (35%), browsing information for longer before deciding (33%), and reduced travel requirements (25%). Access to comprehensive product information, customer reviews, and product comparison websites are also highly valued.



The survey also highlighted the complementarity and continued importance of in-store shopping in the overall retail journey. Whilst 21% of consumers shopped online at least weekly, 83% of consumers reported shopping in-store at least once a week, showing the enduring relevance of physical stores. When asked to select their top three benefits from shopping in-store, consumers cited reasons relating to being able to try products before buying (30%) the ease of assessing product quality (27%) and product attributes (20%).

Whilst consumers appreciate the benefits of online shopping, they also have identified some key concerns. High or unexpected delivery fees were significant concerns for consumers, cited by almost two thirds of online shoppers (65% and 58%, respectively). Security and trust issues also surfaced, with 56% expressing concerns about payment security and 50% about privacy. Additionally, over half of respondents cited concerns related to products and services, specifically the returns process (51%) and uncertainty about product quality or suitability (50%). These findings underscore the need for transparency and predictability in the e-commerce experience.

Looking ahead, most Irish consumers (74%) expect to maintain or increase their online spending over the next 12 months, indicating a continued relevance and growth in the e-commerce market in Ireland.

The future of retail in Ireland is evolving, with e-commerce poised to play an increasingly significant role. This study provides valuable insights into this growing landscape, highlighting the need for businesses to adapt and innovate to meet the evolving expectations of the Irish consumer. By understanding the key trends shaping online shopping behaviour, businesses can position themselves for success in this dynamic market.



1. The new face of Irish retail: E-commerce growth and trends

Driving forces behind the growth of e-commerce in Ireland

The e-commerce market in Ireland has experienced significant growth in recent years, with consumer spending estimated around €5 billion in 2024 (estimated at 14% of total retail) and potentially reaching €8 billion before the end of the decade.^{1,2}

This growth, reflecting a large increase in people's online spending, is driven by a confluence of factors, including evolving consumer preferences, business adaptations, and a changing economic landscape.³

Widespread internet access and adoption of digital devices, such as laptops and smartphones, have led Irish consumers to increasingly choose to shop online for its convenience, wider selection, and competitive pricing. Recognising this shift, retailers, both domestic and international, have invested to establish their presence online, further promoting e-commerce growth. Moreover, recent global and domestic challenges faced by Ireland, including rising inflation and cost of living pressures, have accelerated this trend. Changes in behaviour from COVID-19 have endured, where lockdowns and social distancing measures made it necessary for consumers to seek safer alternatives to crowded stores, while store closures and travel restrictions made online shopping the only viable option. Also, the prolonged economic uncertainty throughout 2020 and 2021 prompted many consumers to seek out deals and compare prices online.⁴

Figure 1: Growth in online shopping use from 2003 to 2024 in Ireland and the EU-27 (% of individuals shopping online in the last three months)^{5,6}



¹ E-commerce can relate to transactions of goods and services online. This includes physical goods and non-tangible purchases as well such as streaming subscriptions or banking, for example. For the purposes of this study, E-commerce or online shopping will refer to the buying of physical goods by consumers.

² Statista Market Insights. "eCommerce – Ireland". Accessed March 2025.

³ US International Trade Administration. "Ireland Country Commercial Guide". Accessed March 2025.

⁴ Central Statistics Office. "Internet Purchases and Subscriptions Household Digital Consumer Behaviour 2024 - Central Statistics Office"

⁵ Eurostat. "Internet purchases by individuals (2002-2019)". Accessed March 2025.

⁶ Eurostat. "Internet purchases by individuals (2020 onwards)". Accessed March 2025.

Then, the period following the onset of the pandemic has presented ongoing economic challenges, including persistent supply chain disruptions, rising domestic inflation, and an increased cost of living. For example, from 2019 to the start of 2025, prices have risen by 20%, with annual inflation peaking at 7.8% in 2022 and 6.3% in 2023.⁷ Such economic challenges are placing increasing pressures on Irish consumers and their spending power, with the average price for consumer goods and services in Ireland being 37% higher than the EU average in 2023.⁸ Brexit has also contributed to increasing costs for businesses and consumers in Ireland by disrupting supply chains and increasing customs duties. These have led to higher prices of UK goods potentially passed on to consumers. Irish custom duties have nearly doubled since Brexit, with tax revenues from UK goods reaching €264 million in 2023.^{9,10} These global events and domestic changes have contributed to an increasing proportion of Irish consumers shopping online. As shown by Figure 1, in 2024, up to 86% of individuals reported making a purchase online within the preceding three months.¹¹ This marks a 27% increase in online shopping use since 2019, which is higher than the 11% growth observed in the EU.¹² This suggests that Irish consumers are increasingly turning to online shopping to seek more competitive price, greater choice and convenience.

This study seeks to understand the impact on Irish consumers

Despite the notable growth of e-commerce in Ireland, evidence on its effects on Irish consumers remains limited. Focussing on the commerce of physical goods, this study aims to address this gap by examining the impact of online shopping on consumers, with a particular focus on price dynamics and evolving online shopping habits and preferences.¹³

To achieve this, the study leverages three key pieces of evidence. Firstly, a consumer survey enables to gather insights on a representative sample of over 1,000 consumers across the Republic of Ireland.¹⁴ This survey aims to inform on Irish consumers' preferences, perceptions and experiences when shopping online. Secondly, econometric models were employed to investigate the impacts of e-commerce on price and how this may benefit consumers. Finally, a bespoke online price index for the Irish market was developed to assess the stability of online prices, compared to the overall inflation, and the role of e-commerce in helping consumers maintain their purchasing power.

The report is structured as follows:

- **Section 2** assesses the impact of online shopping on prices, looking at how online shopping can encourage greater retail competition, or access to wider markets, leading to lower prices.
- **Section 3** examines the impact of e-commerce on the wider shopping experience, specifically in the enhanced choice, convenience, accessibility, and transparency given to consumers.
- **Section 4** highlights the evolving habits and preferences of Irish consumers, key challenges they face as well as their expectations for the future.

⁷ Central Statistics Office (2025). "Consumer Price Index February 2025".

⁸ Eurostat. "Comparative price levels of consumer goods and services". Accessed March 2025.

⁹ Irish Tax and Customs (2023). "Customs Duties in 2023"

¹⁰ Business Matters (2024) "Ireland's Customs Duties Surge by €700m Post-Brexit, Boosting Exchequer Revenues"

¹¹ Eurostat. "Internet purchases by individuals (2020 onwards)". Accessed March 2025.

¹² Eurostat. "Internet purchases by individuals (2002-2019)". Accessed March 2025.

¹³ Amazon partnered with Deloitte on assessing the impacts of e-commerce on Irish consumers and prices. Deloitte designed the consumer survey and carried out the corresponding analysis. Deloitte also used econometric analysis and an online price index to estimate the impact of e-commerce on retail prices. The views expressed in this report are Amazon's alone.

¹⁴ The consumer survey was conducted in March 2025 in partnership with Ipsos Mori.

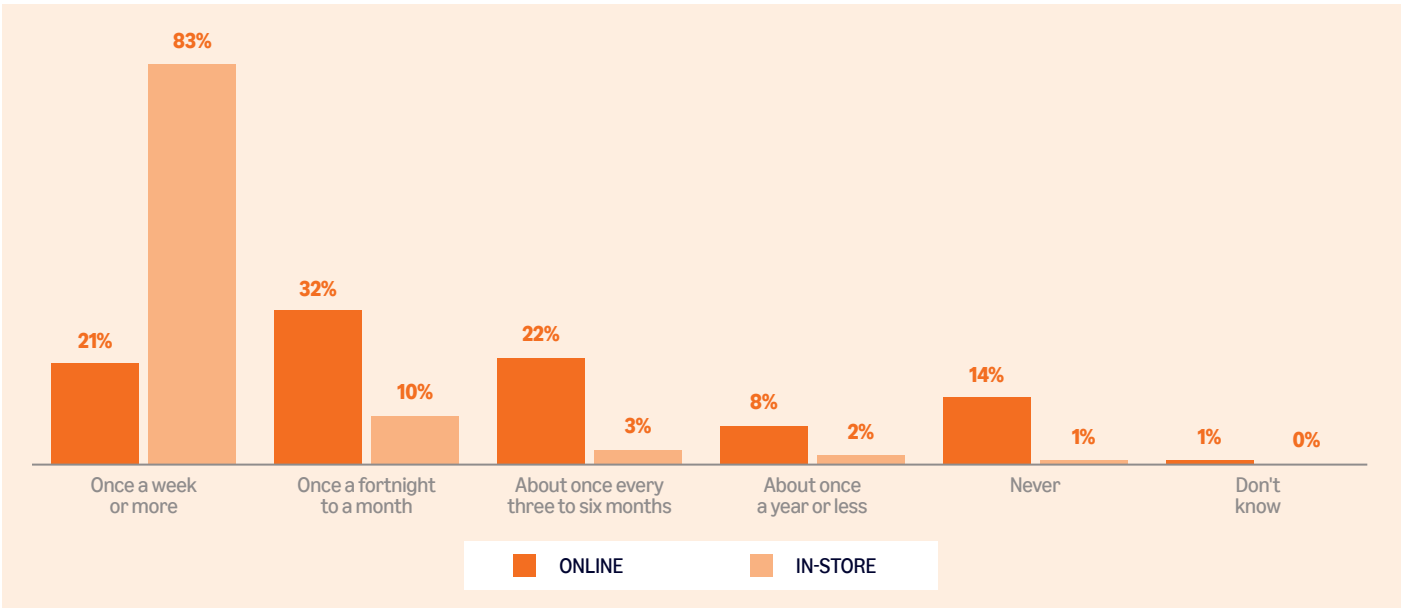
A consumer survey of over 1,000 Irish adults aged 16-75 was conducted to explore the impact of online shopping. The survey aims to explore the consumers' preferences and behaviours, their own perceptions of online shopping benefits, and highlight past, current or emerging e-commerce trends. The survey was conducted by Ipsos Mori in March 2025.

Use of online shopping

21% of Irish consumers indicated that they purchased goods online at least weekly and 54% of them at least monthly.

Online shopping frequently peaked among respondents aged 35-44, with 30% reporting weekly online purchases. This was followed by the 25-34 age group (27% weekly online shoppers) and the 16-24 age group (20% weekly online shoppers). In contrast, only 15% of those aged 55-75 reported shopping online weekly.

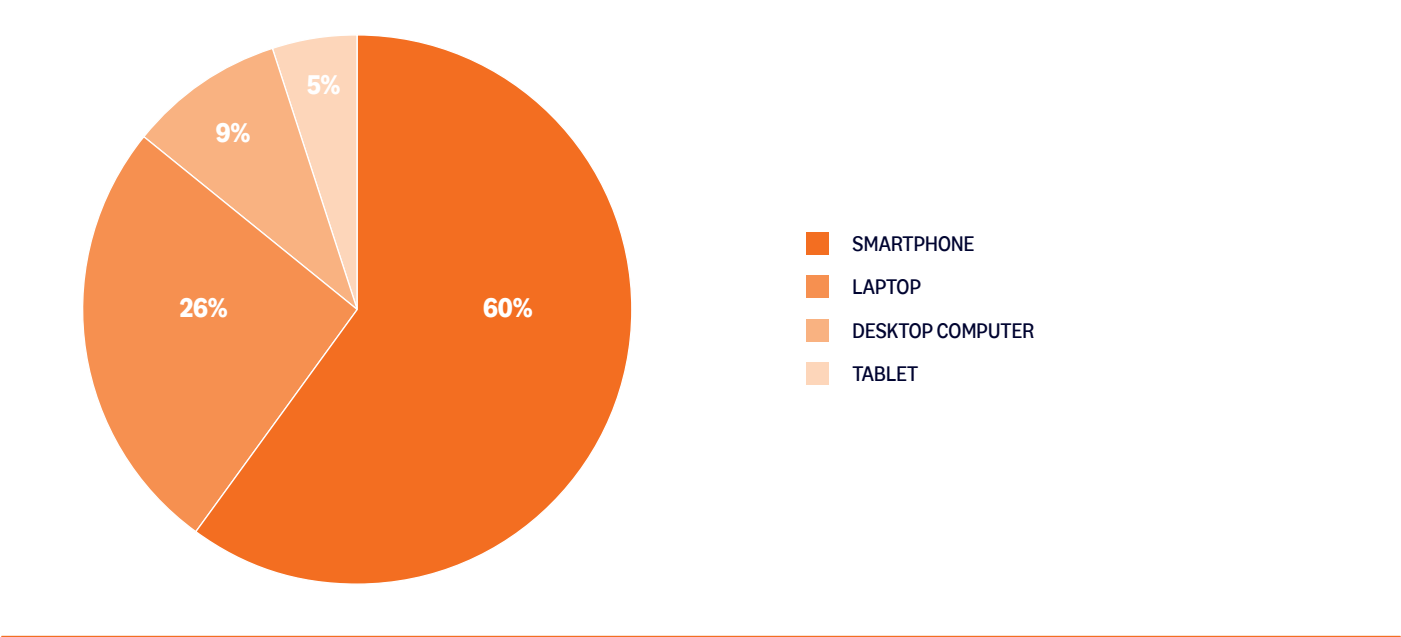
Figure 2: Frequency of shopping, online vs in-store, % of Irish consumers



Devices used to shop online

80% of consumers reported using smartphones to shop online. Other devices included laptops (44%), desktop computers (15%), tablets (17%), and voice assisted speakers (2%). The primary device used by consumers was smartphones (60%).

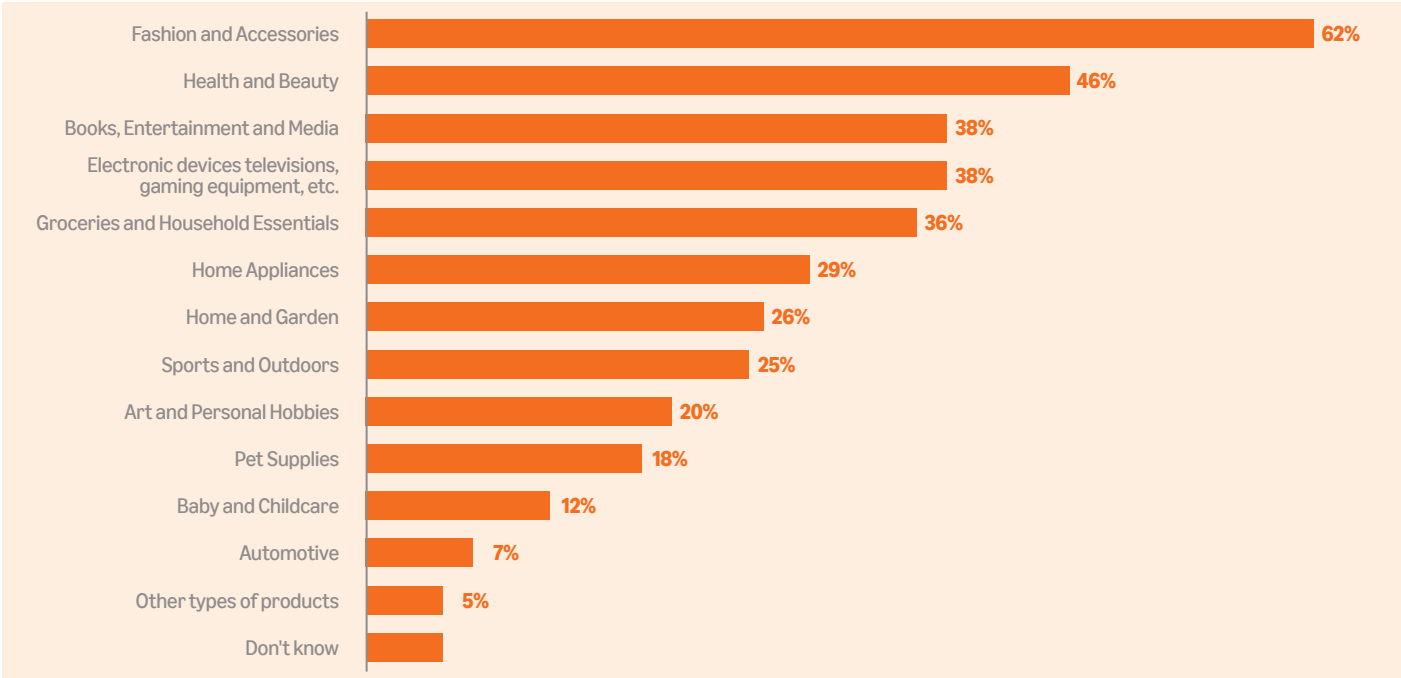
Figure 3: Primary device used for online shopping, % of Irish consumers



Categories of goods purchased online

Fashion and accessories were the most frequently purchased goods online, driven primarily by female respondents (76%, compared to 48% of male online shoppers). Similarly, 63% of women purchased health and beauty products, relative to just 29% of men. Male respondents were 21 percentage points more likely to buy electronic devices (48% vs 27%).

Figure 4: Categories of goods bought online (% of online shoppers)

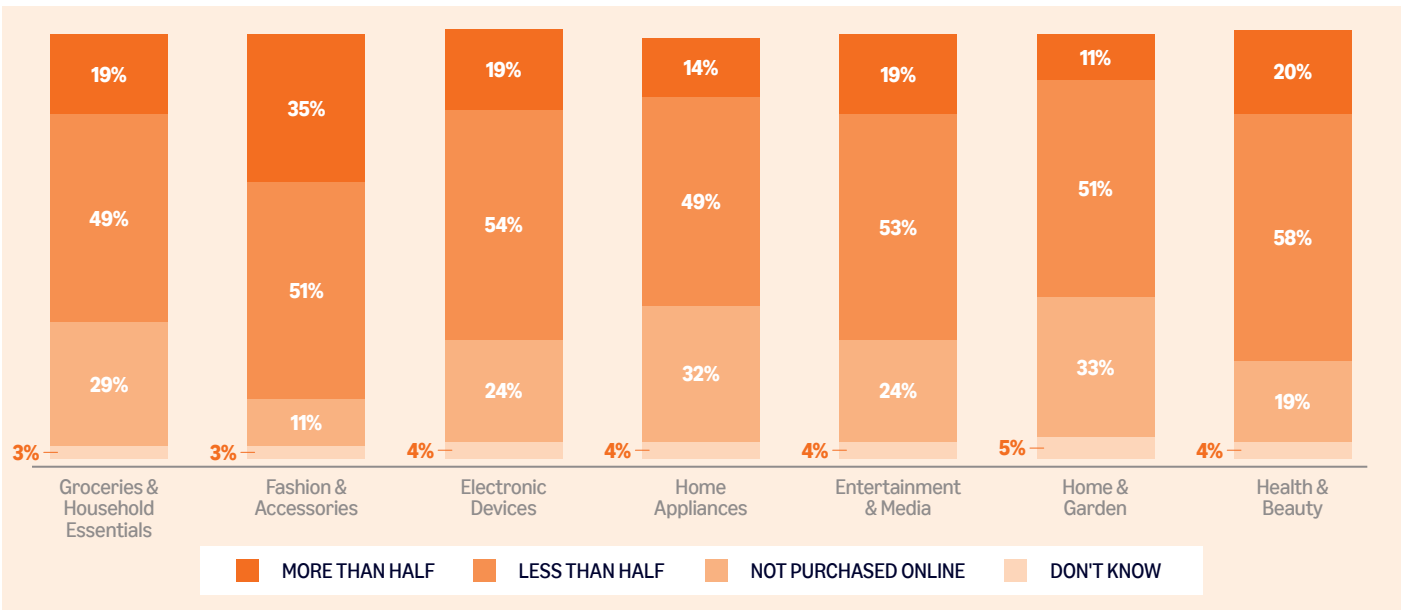


Proportion of shopping online

Although shopping online is popular, when asked about the split of their personal spend on products, two thirds (67%) of shoppers say they typically spend more in-store. Less than 1 in 5 (18%) say they spend more online, with 25-44s being more likely to say so (24%).

Online marketplaces such as Amazon, Etsy and eBay are the most popular shopping destinations over the past year, cited by 64% of respondents, 47% reported buying directly from brand websites, 44% from Irish retailers and 37% from supermarkets.

Figure 5: Proportion of shopping done online by good (% of online shoppers)



Note: The figures in each bar may not sum to 100% due to rounding.

2. Impact of E-commerce on price

Amidst a challenging economic backdrop, marked by inflationary pressures and cost-of-living concerns, understanding the influence of online shopping on prices is crucial for a comprehensive understanding of consumer motivations and impacts. This section will explore how increased access to markets for consumers through their e-commerce use, and the resulting heightened competition within the retail landscape, can impact prices. Further analysis is then conducted to examine how this shift towards online shopping can empower households to maintain, and potentially even increase, their purchasing power.

By providing more choice to consumers, e-commerce may lead to greater competition which, in turn, may lower inflationary pressures on price

The increasing prevalence of e-commerce in Ireland provides consumers with an expanded access to products by breaking down geographical barriers. Whilst consumers tend to otherwise be largely limited to outlets within local proximity, online shopfronts are helping consumers to access a diverse range of products and retailers domestically and around the world.

This increased access to products has reshaped the retail landscape, fostering a more competitive environment. Consumers can now easily compare prices from a wider range of retailers, both online and in physical stores, thanks to online marketplaces and price comparison websites.¹⁵ This price transparency empowers consumers to make more informed decisions, often prioritising value. This perception is echoed in the survey findings, with two thirds (66%) of consumers agreeing that prices are typically cheaper online. Moreover, over a third (37%) reported that the ability to find cheaper prices or get better deals was one of their primary motivations for shopping online. Given that consumers can now easily compare prices from a wider range of retailers, businesses are pushed to differentiate their offerings to attract and retain customers.¹⁶

Online businesses can often respond to the increased competition by adopting competitive pricing strategies, leveraging their typically leaner cost structures to offer lower prices, or pass on savings to consumers through discounts and promotions.¹⁷ Furthermore, they can also use other differentiators, such as unique or wider product selections, improved customer service, or personalised shopping experience.¹⁸ Ultimately, the ease with which consumers can access information and compare options online compels businesses to prioritise value and innovate to meet evolving expectations.¹⁹

¹⁵ Sharp & Dawes (2010). "What is Differentiation and How Does it Work?"

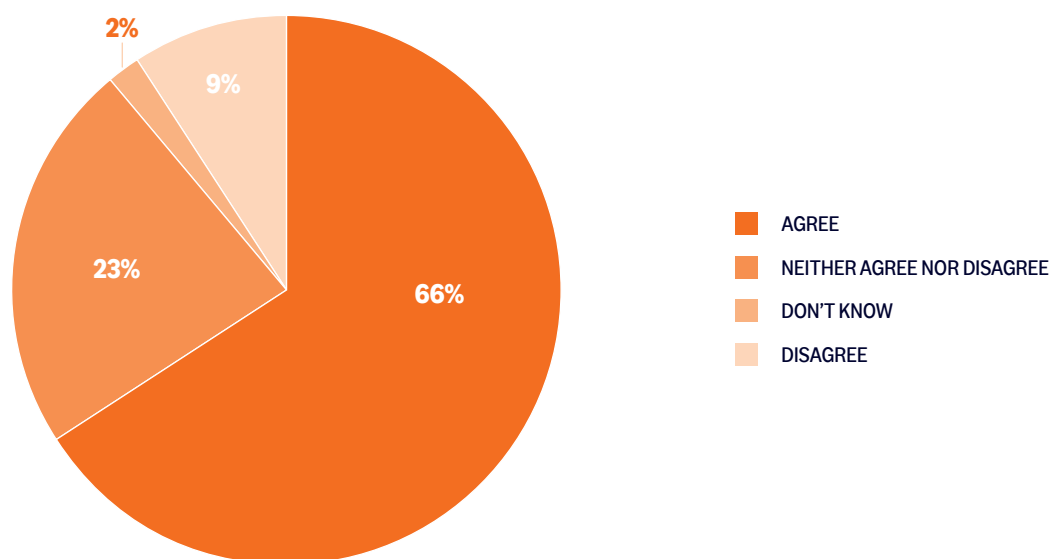
¹⁶ European Commission. "Why is competition policy important for consumers?". Accessed March 2025.

¹⁷ Magretta (2002). "Why Business Models Matter"

¹⁸ Morikawa (2021). "Price competition vs. quality competition: Evidence from firm surveys"

¹⁹ Schmidt et al. (2016). "Exploring the choice between in-store and online shopping"

Figure 6: Irish consumers were asked to evaluate the following statement: “products are generally cheaper when I buy them online” in the survey conducted in March 2025



The convergence of increased access to products, price transparency and heightened competition within the e-commerce landscape may lead to a greater level of price competition, and downward pressure on prices across a range of product categories.^{20,21} The expansion of online shopping in Ireland means consumers are better placed to select goods most suited to their needs, at the best price. In this context, the following section empirically examines whether the growth of online shopping in Ireland has contributed to lower prices and helped Irish consumers maintain their purchasing power.

Testing the relationship between use of online shopping and price in Ireland

Two econometric models were constructed for this study. The first model (the Eurozone model) attempts to corroborate existing literature and develop estimates on the relationship between e-commerce penetration (i.e. how popular online shopping is) and the rate of inflation (i.e. how quickly price indices²² are rising) in the Eurozone.

The Eurozone model

The 'Eurozone model', spans 18 Eurozone countries, uses yearly data from 2002 to 2023, and represents e-commerce with data on "the proportion of people purchasing online in the last 3 months". Further methodological details underlying this model and its estimation are presented in Appendix B.

The estimated relationship from the Eurozone model indicates a clear link between the growth of online shopping and lower inflation. The findings suggest that a 1 percentage point rise in e-commerce penetration – meaning more people shopping online – is associated with a 0.05-0.06 percentage point decrease in inflation. This implies that the growth of e-commerce appears to be contributing to a slowdown in the rate of price increases or even lower prices.

²⁰ Coffinet & Perillaud (2017). "Effects of the Internet on inflation: an overview of the literature and empirical analyses"

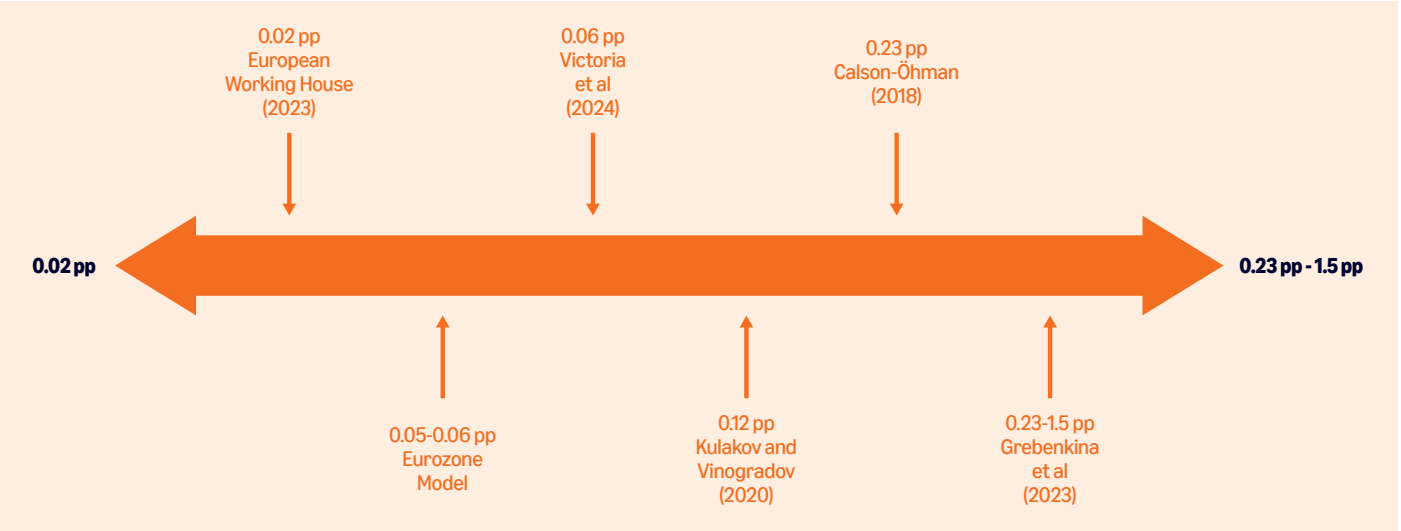
²¹ Busso (2018). "The Causal Effect of Competition of Prices and Quality: Evidence from a Field Experiment"

²² Econometric analysis was run over several price indices; CPI, HICP and other subsets of these indices

These findings are in line with the existing literature where the link between the penetration of online shopping and price has been explored in several studies. For example, Lacuesta et al. (2020) analysed the impact of increased e-commerce on the mark-up charged by firms in Spain (i.e. the difference between the price and the cost to produce goods). They found that between 2009 and 2016, an increase in the use of e-commerce by 1 percentage point led to a 0.4 percentage point fall in the mark-up.²³ In other words, as online shopping became more popular, the mark-up on goods decreased. The European House Ambrosetti (2023) also estimated that the growth in online shopping in Italy between 2017 and 2023 likely helped to slightly slow down the rate at which prices were increasing overall (i.e. 1 percentage point increase in e-commerce growth was associated with a 0.02 percentage point fall in annual inflation from 2017 to 2023).²⁴ Similarly, in a study over 19 countries of the Eurozone from 2010 to 2018, Kulakov & Vinogradov (2023) estimated that a rise in online shopping was linked to a small decrease in how fast prices were rising overall (inflation) - a 1 percentage point increase in e-commerce was associated with a 0.12-0.13 percentage point decrease in inflation rates.²⁵

It is important to note that many studies assess e-commerce based on its penetration rate (i.e. percentage of people using e-commerce in one country). Therefore, estimated impacts on areas like price may lessen or become more transient as online shopping reaches saturation.²⁶ In other words, as online shopping growth plateaus, its price-lowering effects may diminish to some degree. Further research, detailed in the following sub-section on online prices, suggests that these impacts may also depend on factors such as the level of competition and the distribution model of retailers.

Figure 7: Effect of a 1pp increase in e-commerce on inflation rates



Whilst there is a growing body of evidence of the impact of online shopping (and broader digitalisation) on inflation rates, there is a lack of evidence specific to the Irish market. Therefore, further analysis was undertaken in this study to empirically test whether greater online shopping in Ireland led to downward pressure on prices.

The second model (Ireland model) aims to confirm the validity of the relationship between online shopping and inflation in Ireland, using an alternate measure for e-commerce penetration over a shorter and more turbulent analysis period (2018 to 2024).²⁷

²³ Lacuesta et al. (2020). "Effects of E-commerce on Prices and Business Competition"

²⁴ The European House Ambrosetti (2023). "E-commerce: Perceptions and Evidence of Benefits for Citizen, Businesses, and the Italian Economy"

²⁵ Kulakov & Vinogradov (2020). "Study on the Impact of E-commerce Development on Inflation in the Euro Area"

²⁶ Strasser et al. (2023). "Occasional Paper Series. E-commerce and price setting: evidence from Europe"

²⁷ Due to data availability, the proxy for e-commerce penetration (turnover from e-commerce) is related to domestic businesses rather than consumers.

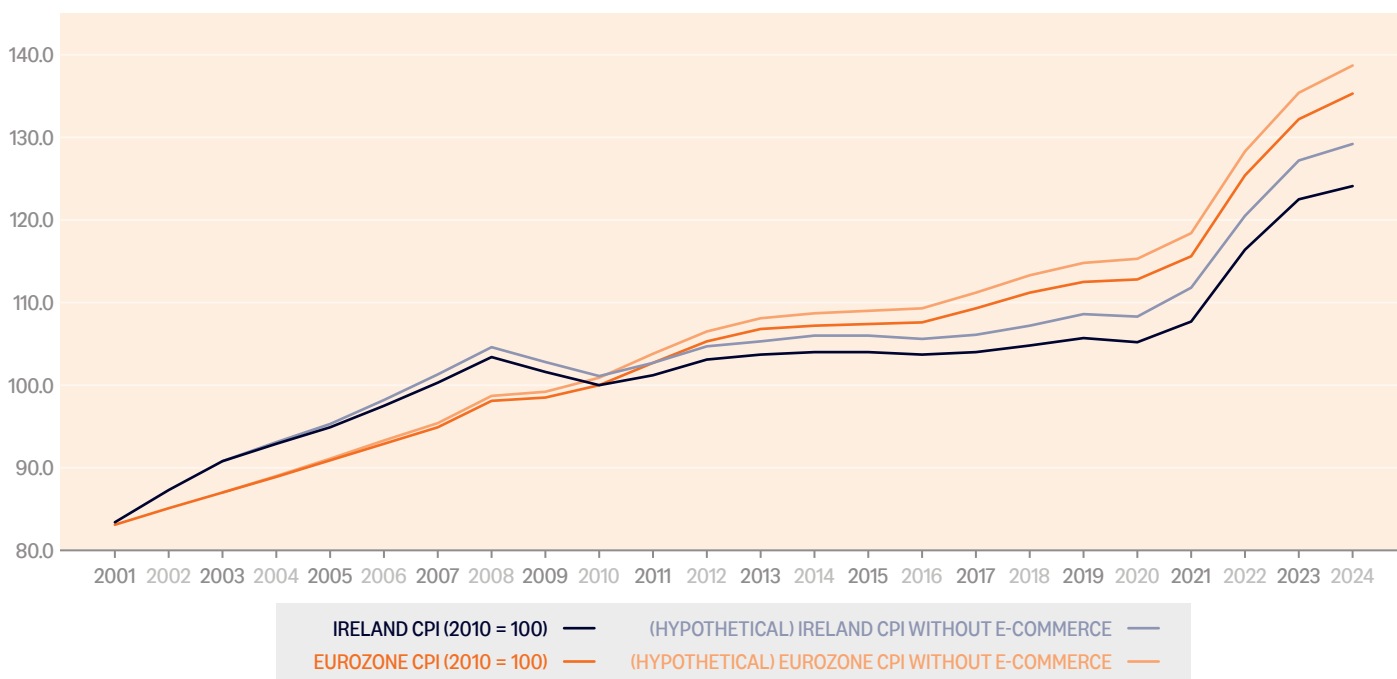
The Ireland model

The 'Ireland model' – an Ireland-specific model uses monthly data from December 2018 to December 2024 and represents e-commerce using 'online retail turnover (%)'. Further methodological details underlying this model and its estimation are presented in Appendix B.

The results of the Irish model, while subject to caveats around data availability, provide supporting evidence that e-commerce penetration plays a moderating role in inflation in Ireland. Estimates derived from the Irish model suggest that a 1 percentage point increase in online retail turnover, generated from online sales, is associated with a 0.03-0.06 percentage point fall in annual inflation. The analysis conducted robustness checks to isolate the impact of the macroeconomic shocks. The estimates were by and large unchanged, however the extent and power of robustness checks were somewhat limited by sample sizes available.²⁸ Additionally, the results are in line with established literature, economic theory, and results from the Eurozone model described earlier. The Irish model's coefficients share the same sign and magnitude as those found in the Eurozone model, although due to differences in how e-commerce penetration is measured, a direct comparison between the two models is not possible.²⁹

Applying estimates from the Eurozone model, back to 2002³⁰ suggests that current price levels would be approximately 4.1%³¹ higher in the absence of e-commerce.³²

Figure 8: Impact of e-commerce on CPI in Ireland and the Eurozone



²⁸ The model covers a period associated with macroeconomic turbulence from COVID-19 and energy price shocks. Sensitivity analysis was performed to check robustness of the model against both events by dropping the period covering COVID-19 (March 2020 to October 2021), dropping the period covering energy price volatility (April 2022 to December 2023), and by inclusion of an oil price variable. The Irish model demonstrated robustness to both the inclusion and exclusion of the oil price variable and the period of energy price spikes. Results remained consistent and significant in both scenarios. Similarly, excluding the COVID-19 period did not alter the direction or magnitude of effects, though significance was lost. This is likely attributable to the reduced sample size and decreased temporal variation from fewer observations.

²⁹ Furthermore, both the Irish and Eurozone models were robust to the inclusion of variables that were potentially correlated with e-commerce penetration, such as digitalisation.

³⁰ Data on e-commerce penetration in Ireland begins from 2002.

³¹ This value is calculated by adjusting Irish inflation each year (from 2002 to 2024) to its hypothetical value in the absence of e-commerce. This adjusted inflation series is then used to grow Irish CPI from its 2002 value to 2024.

³² E-commerce is likely to have had a downward impact since its inception, but this calculation can only be run from 2002 onwards due to data availability. As a result, this figure is likely an underestimate of the true disinflationary effect of e-commerce.

Taking 2024 as a specific example; the growth of e-commerce in Ireland is estimated to have reduced inflation by 0.28 percentage points, from a hypothetical 1.61%³³ to the observed 1.33% in 2024.³⁴

The analysis also points to varying disinflationary effects across goods categories. For example, in the Irish model, e-commerce penetration had a strong and significant effect on clothing and footwear in Ireland³⁵; a 1 percentage point increase in online turnover was associated with a 0.047 percentage point fall in inflation in these goods. On the other hand, the effect of e-commerce on furnishings, household equipment, and maintenance goods in the Eurozone was negligible and insignificant, suggesting limited effects from e-commerce on the prices of these goods. A full breakdown of individual sub-indices and e-commerce (across both Irish and Eurozone models) can be found in Appendix B.

The econometric models provide evidence that e-commerce exerts a disinflationary effect on the Consumer Price Index (CPI), both across the Eurozone and in Ireland. To complement this analysis, an online price index was constructed to investigate the purchasing power of consumers within the online shopping environment specifically, and compare it to the broader CPI.

Testing the impact of e-commerce on consumers' purchasing power

In the recent era of economic uncertainty and high inflationary pressures, online shopping has increasingly been used in Ireland. Further analysis was undertaken to understand the potential role of online shopping in supporting Irish consumers' purchasing power. This was achieved by examining the evolution of the price of online consumption relative to general inflation in Ireland (as measured by the rate of change of CPI).

Using data on products purchased online from 2019 to 2024, an online price index was constructed.³⁶ This index serves as a valuable and complementary tool for understanding how online shopping may have influenced prices. By comparing it to the overall Consumer Price Index (CPI),³⁷ it can be determined if online prices of goods behave differently than prices in the broader economy.³⁸ It is important to note that the online price index is based on the actual price paid by consumers, while the CPI is based on advertised price. Therefore, the analysis focusses on identifying relative trends and differences in inflation between the two baskets, rather than comparing the absolute price levels.

The period from 2019 to 2024 is particularly interesting for this analysis due to its economic volatility. It captures the pre- and post-COVID-19 pandemic landscape, including the subsequent surge in inflation. While the CPI in Ireland rose by almost 20% during this time, the seasonally adjusted online price index increased only by 3%, as shown in Figure 9.

³³ E-commerce penetration rose by 5.5 percentage points between 2023 and 2024. Applying the Eurozone model's estimates, this increase in online shopping translated to a 0.28pp (5.5×-0.051) fall in the inflation rate (from 1.61% to 1.33%).

³⁴ Data from the Economist Intelligence Unit. Accessed March 2025.

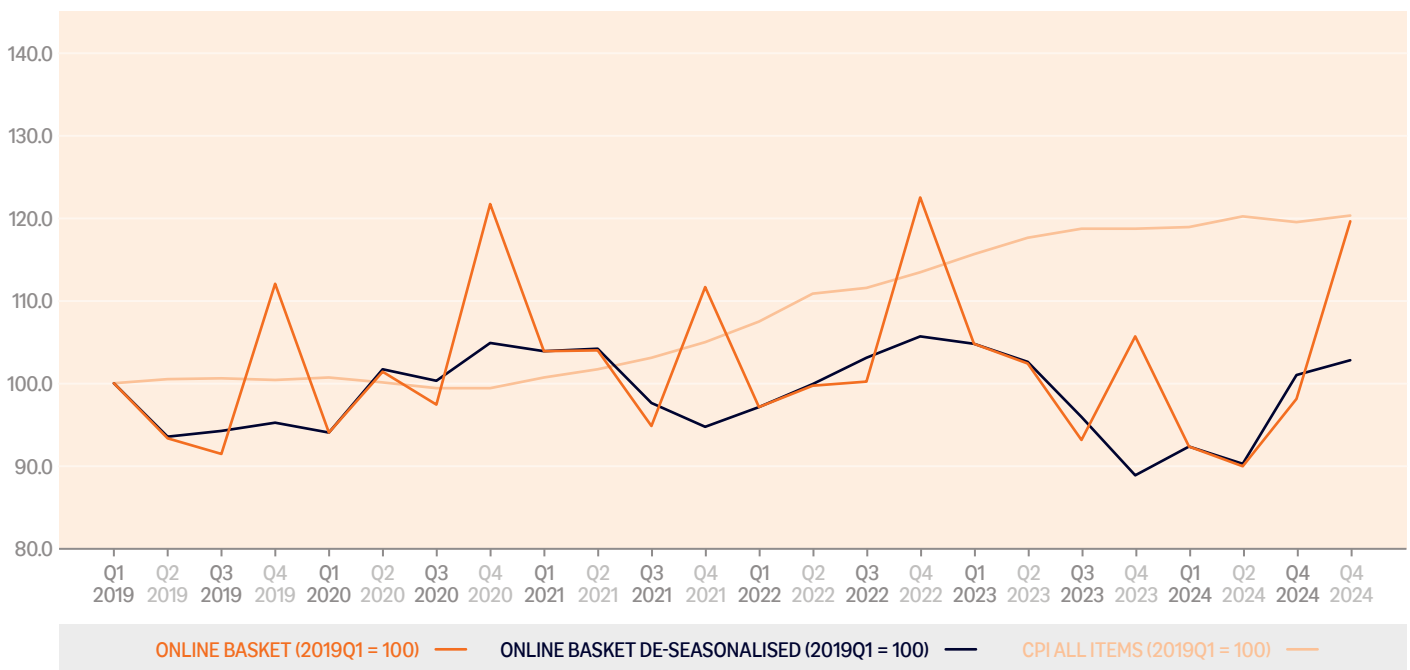
³⁵ The clothing and footwear category was statistically significant in the Irish model but not in the Eurozone model. The Eurozone model uses annual data, which offers lower across time variation, compared to the monthly data used in the Irish model, which is important for the identification of the coefficient.

³⁶ This method is similar those employed by The European House Ambrosetti (2023) and Goolsbee & Klenow (2018).

³⁷ The Consumer Price Index is an index that tracks the cost of a representative basket of goods purchased by Irish households. It is employed in this context to measure the change in purchasing power that households experience over time.

³⁸ These differences were confirmed using a Student's t-test to determine whether differences were significant. Significance in this context suggests that CPI was in fact, higher than the online price index and that this was unlikely to occur by chance.

Figure 9: Online Basket and CPI (2019Q1 = 100)



Interestingly, the online price index grew outpaced inflation between early 2020 to mid-2021. This aligns with the surge in e-commerce demand during lockdowns and restrictions on in-store shopping. E-commerce revenues saw 10% additional growth in Europe in 2020 due to the COVID-19 crisis.³⁹ However, the seasonally adjusted online basket subsequently falls below the CPI, suggesting that online prices became generally more competitive, as e-commerce supply chains adapted to the initial spike in demand.

The unadjusted online index displays strong seasonal patterns, with an annual spike in the fourth quarter coinciding with the end of year festive period. This may reflect a change in online consumption patterns or the ability of online retailers to adjust prices more dynamically in response to increased demand compared to traditional retailers.

Findings from the online price index indicate that the price of online consumption remained relatively stable from 2019 to-2024, even as Irish consumers faced high overall inflation. The divergence between the CPI and the online price index suggests that online consumption may have helped to support households' purchasing power. In other words, online shopping may have enabled consumers to acquire goods with their income more effectively than would have been possible relying solely on traditional retail channels.⁴⁰

³⁹ Jilková & Králová (2021). "Digital Consumer Behaviour and eCommerce Trends during the COVID-19 Crisis"

⁴⁰ CPI and the online basket are not directly comparable but are instead measures of purchasing power. CPI tracks prices of the same goods over time, whereas the online basket tracks purchases. Furthermore, the pattern of consumption in both baskets will be different from one another.

Three interconnected factors are likely to contribute to the observed lower growth in the online price index:

- **Lower online inflation:** goods purchased online are typically cheaper, and rise more slowly, than the goods whose price are tracked in the consumer price index.
- **Increased price sensitivity:** Online shoppers have greater price transparency and can easily compare prices across multiple retailers, making them more price sensitive. This sensitivity is likely heightened during periods of high inflation.
- **Change in online shopping composition:** as inflation rise, consumers may change their consumption patterns towards lower-priced goods and might purchase less expensive items online.

The analysis also compared specific product categories, or sub-indices, of the online basket and CPI. This was undertaken to identify the categories of goods where the impacts of online shopping on price dynamics were more pronounced. Specific categories of goods experienced lower price growth than their counterpart indices in CPI,⁴¹ as illustrated by Table 1 (detailed table in the Appendix C). In particular, online prices for clothing and footwear were found to have grown at a slower rate than their CPI-counterpart. These results corroborate the findings of the Irish econometric model, which indicated that the growth of e-commerce exerted downward pressure on certain sub-categories, including clothing and footwear.

Table 1: Sub-indices from the online price index that lay beneath CPI (at various significance levels)

Sub-index	Was the online sub-index higher (↑) or lower (↓) than CPI?	Significance level ⁴²
Clothing and footwear	↓	2.23%
Recreation and culture	↓	<0.01%
Miscellaneous goods and services	↓	<0.01%

Table 1 shows that at the 5% significance level and below, the three sub-indices above experienced lower price growth than their counterparts in CPI. These findings are in line with other countries, where studies also find the evolution of online price indices both trended and evolved at a slower rate when compared to overall inflation.^{43,44,45}

Findings from broader studies reiterate that these impacts are unlikely to be spread equally across sectors. Several factors influence the degree to which online prices may be lower and can support consumer purchasing power, including competition within markets, the distribution models of retailers, the specific country and product sector.

⁴¹ This suggests that the sub-indices in Table 1 have driven the overall result of the online price index growing at a slower rate than CPI – the other sub-indices (detailed breakdown in Appendix C) were either insignificant or grew at a greater rate than CPI.

⁴² Significance level refers to the level of confidence there is that a statistical result didn't occur by chance. For example, a significance level of 2.23% suggests that there's a 2.23% chance this relationship occurred by pure randomness. If the significance level is low (traditionally less than 5% or 10%), the finding interpreted as not occurring by chance.

⁴³ Jo et al. (2019). "The Impact of E-commerce on Relative Prices and Consumer Welfare"

⁴⁴ Charbonneau et al. (2017). "Digitalization and Inflation: A Review of the Literature"

⁴⁵ Gorodnichenko et al. (2018). "Price Setting in Online Markets: Does IT Click?"

For instance, the online price advantages may diminish as larger businesses or multi-channel retailers (retailers operating both online and in-store) dominate markets, leading to greater price uniformity between online and offline channels. Research by Carvalho (2017) supports this, suggesting that only minor differences between online and offline prices are present where multi-channel retailers are dominant.⁴⁶ Their study comparing online and offline prices for identical products of multi-channel retailers across ten countries, found that on average, 72% of prices were identical on average, ranging from 42% in Brazil to 91% in Canada and the United Kingdom.

Furthermore, distribution models (home delivery vs click and collect) also matter. Strasser et al (2023) found that in the FMCG (fast moving consumer goods) market, online prices are lower than offline prices in France, where the click and collect model dominates. Conversely, online prices were higher than offline prices in the UK, where home delivery is more common.⁴⁷ These findings highlight the complex interplay of factors influencing online pricing dynamics.

Online Price Index Analysis

The Irish online price index is constructed using a dataset with over 6 million observations of online purchases between 2019 and 2024. The index is calculated by aggregating at a quarterly frequency and developing an index forming the average price, weighted by CPI weights. This index figure is correspondingly set to 100 in 2019 to enable comparison with CPI.

The index enables the tracking of fluctuations in the cost of an online basket of goods over time. As the index is constructed from product purchase data, rather than directly from product price data, changes in the index may reflect both changes in product prices and/ or changes in consumer purchasing behaviour. In addition, due to seasonal variations, affecting both the kind and quantity of goods purchased online, a seasonally adjusted price index was also calculated.

The Online Price Index was then compared against the consumer price index (CPI, the primary measure of inflation representing the typical purchase of a consumer). This comparison can be used to identify whether the two observe different trends (both in the level of the index and its growth over time, indicating the relative cost of consumption, and the change in the price of consumption, respectively). These comparisons can be demonstrated both graphically and statistically (using student t-tests, to assess the significance of any observed price series over the same period). This was replicated with constituent good sub-indices, for 12 categories, mirroring those present in the consumer price index to compare in a similar manner.

Further methodological information, including details on the online price basket and the statistical tables is in Appendix C.

⁴⁶ Cavallo (2018). "More Amazon Effects: Online Competition and Pricing Behaviors"

⁴⁷ Strasser et al. (2023). "Occasional Paper Series. E-commerce and price setting: evidence from Europe"

3. How E-commerce is changing the wider shopping experience

As highlighted in section 2, the expanded choice offered by online shopping can help contribute to downward pressure on prices, both in-store and online. Beyond its impact on price, this section explores the broader non-price benefits that attract consumers to e-commerce.

A key advantage is the increased choice itself. Online retail enables consumers to take advantage of the increased choice by providing easy access to information so that consumers can select the most suitable product for their needs, from a wide variety of options. Additionally, advancements in e-commerce have enhanced convenience; adding features such as next-day delivery, so that consumers can access and purchase a wide variety of goods with relatively little time and effort.

Consumers have a greater choice online

Consumers are drawn to online shopping for its wider product selection. Access to a wider array of products, from both domestic and international retailers, can enable consumers to choose products that better align with their individual needs and preferences, ultimately improving their satisfaction.^{48,49} This sentiment is echoed in our survey findings, where over four fifths (81%) of respondents agreed that online shopping provides access to products unavailable locally. When asked about their reasons for shopping online or planning to do so more often, about a third of Irish consumers highlighted two key motivators: access to a wider selection of products (33%) and the lack of local access for their preferred retailers or brands (31%). This highlights the role that choice and access to products play in driving consumers towards e-commerce.

Online Shopping for Rural Populations

Online shopping offers significant benefits to populations with limited access to traditional retail. This is highly relevant to Ireland, where over a third (36%) of the population resides in rural areas.⁵⁰ Geographical isolation can disproportionately impact rural consumers, restricting access to physical stores and reducing product variety compared to urban centres.

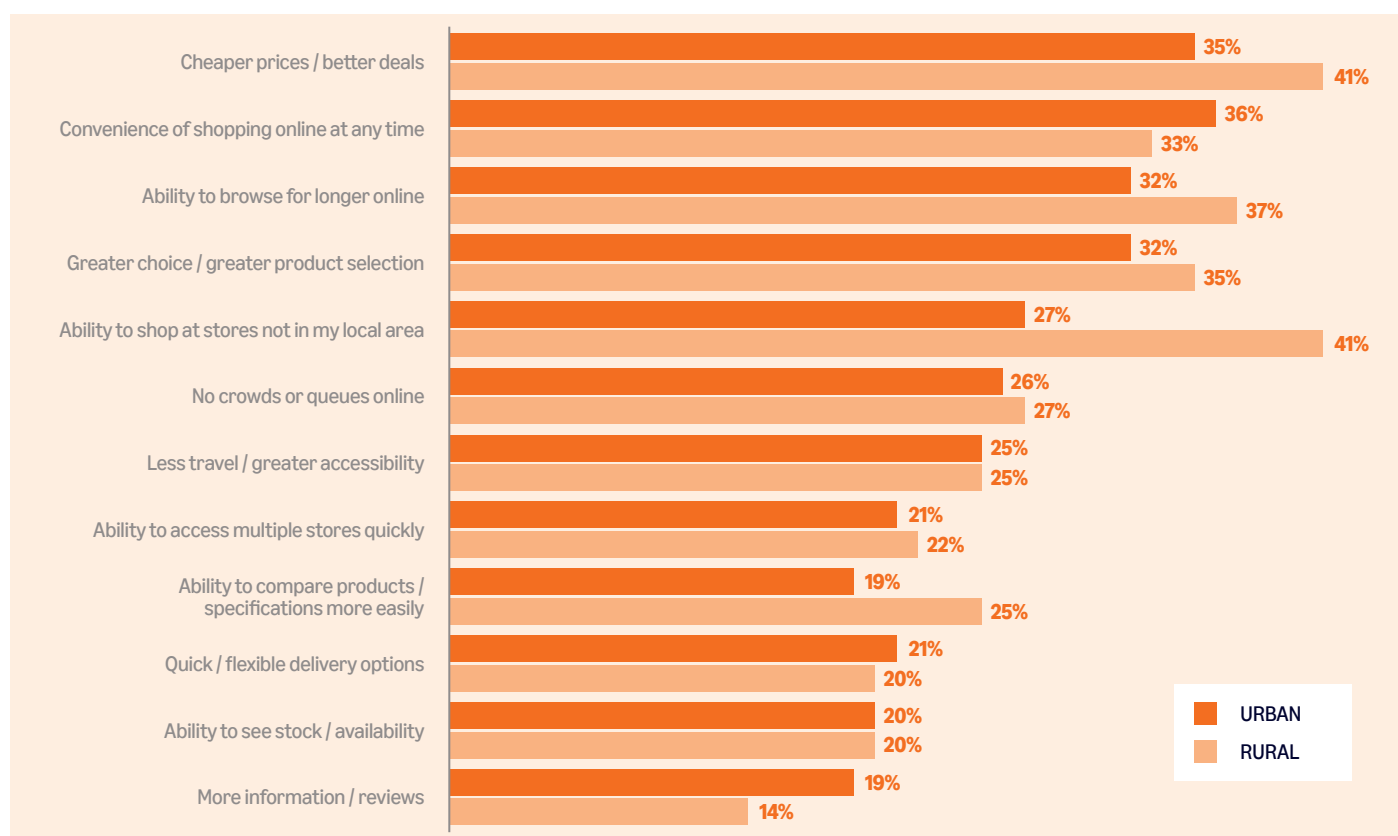
The survey revealed significant differences in the primary motivations for online shopping between urban and rural respondents. Factors related to increased accessibility to shops outside their local areas were cited far more frequently by rural respondents (41%) than urban respondents (27%). Similarly, rural respondents were 6 percentage points more likely to cite finding better deals and prices online as a key motivator. These findings highlight how online shopping helps bridge geographical barriers for rural consumers.

⁴⁸ Dolfin et al. (2023). "Assessing the Gains from E-commerce"

⁴⁹ Brynjolfsson et al. (2023). "Welfare gains from increased product variety at a large digital platform"

⁵⁰ World Bank. "World Development Indicators". Accessed March 2025.

Figure 10: Primary reasons for shopping online now, or intending to in the future, by rural-urban split, survey conducted in March 2025



Information accessible on digital platforms is empowering consumers to take advantage of this increased choice, allowing them to make more informed purchasing decisions

The wealth of information accessible through e-commerce empowers consumers to make more informed purchasing decisions. While increased choice is inherently beneficial, its true value is realised when consumers can easily access and evaluate relevant information. E-commerce can excel in this area, offering detailed product descriptions, customer reviews, product comparison websites, and insights into product availability and retailer inventories.⁵¹ This abundance of information enables consumers to thoroughly research products, compare alternatives, assess different brands, and ultimately make purchases that better align with their needs and preferences.⁵²

The survey highlights how much consumers value easy access to information. Over a fifth (21%) of survey respondents ranked the ability to compare products and specifications online as a top reason for shopping online, as illustrated in Figure 16. Additionally, 17% of online shoppers highlighted the value of product reviews and popularity metrics, which provide insights into product quality and desirability. A further 20% of respondents emphasised the importance of online platforms and marketplaces for checking product availability and retailer inventories.

However, the survey also revealed a potential gap between the availability of information and consumers' ability to effectively utilise it. This suggests that while information is undoubtedly more accessible online, challenges remain in helping consumers navigate and leverage this information to enhance their decision-making process. While 70% of respondents agreed that product information is easier to find online (Figure 11), a smaller proportion (57%) felt more informed when shopping online compared to in-store (Figure 12). This suggests that while access to information is undoubtedly enhanced online, some consumers may struggle to navigate and evaluate the sheer volume of data available.

⁵¹ Ballantine (2005). "Effects of interactivity and product information on consumer satisfaction in an online retail setting"

⁵² Sasaki et al. (2011). "Does greater product information actually inform consumer decisions? The relationship between product information quantity and diversity of consumer decisions"

Similarly, while e-commerce can help consumers stay connected with preferred brands, only slightly more than half (53%) of Irish online shoppers felt that online shopping helped them achieve this (Figure 13). This may suggest an opportunity for businesses to improve how they engage with customers online and foster stronger brand connections in the digital space.

Figure 11: Is it easier to find product information when I shop online? (% of Irish online shoppers), survey conducted in March 2025

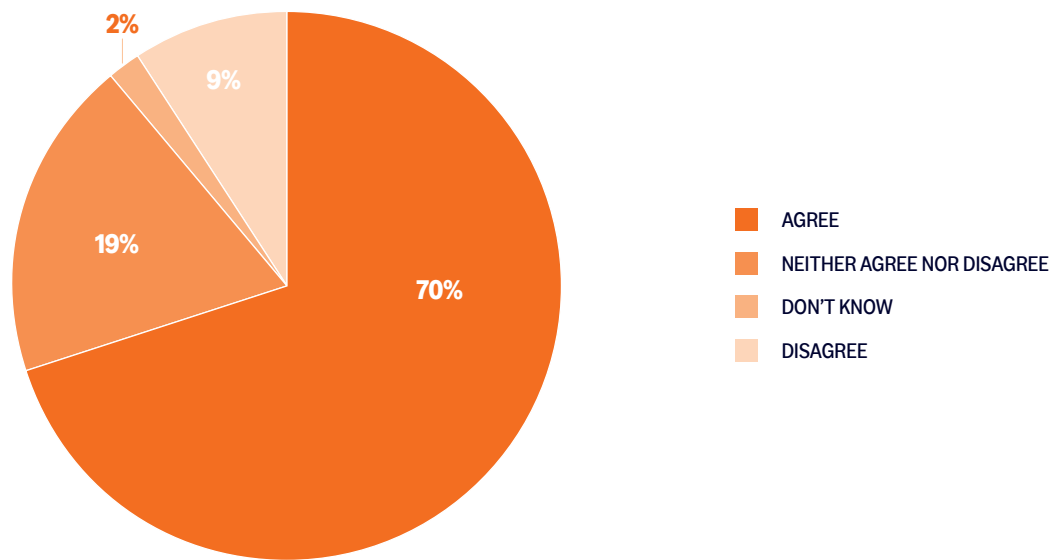


Figure 12: I feel more informed about products when I shop online compared to when I shop in-store (% of Irish online shoppers), survey conducted in March 2025

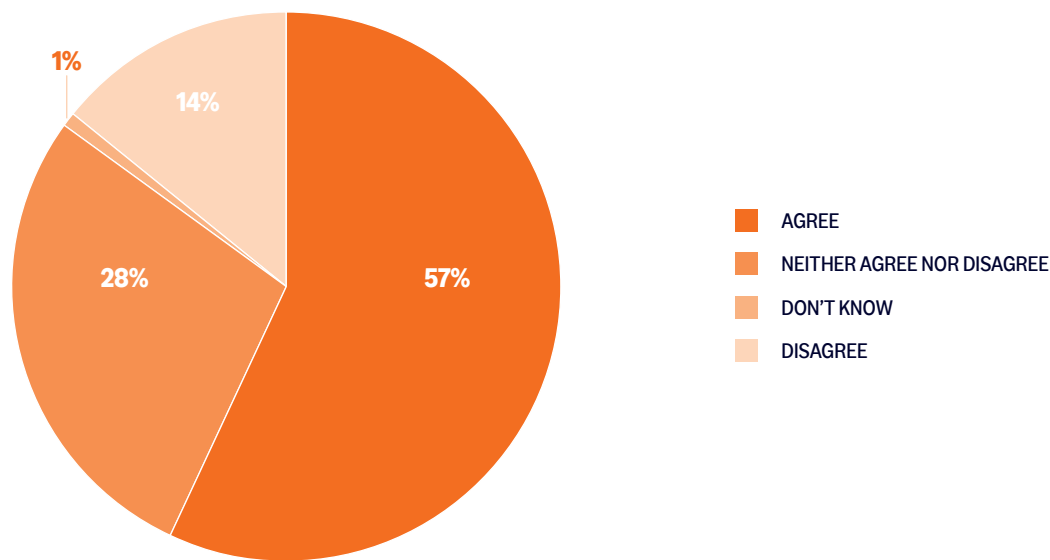
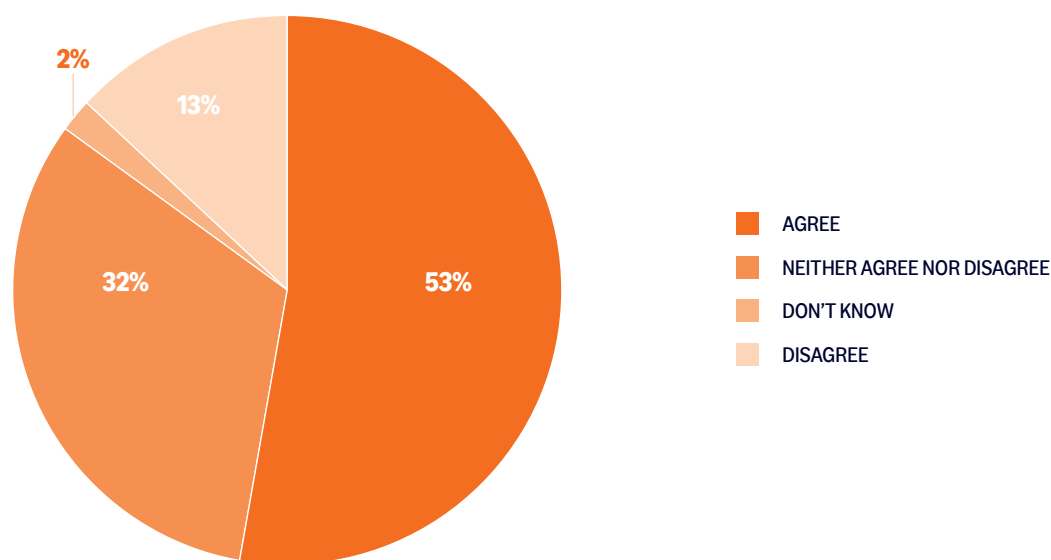
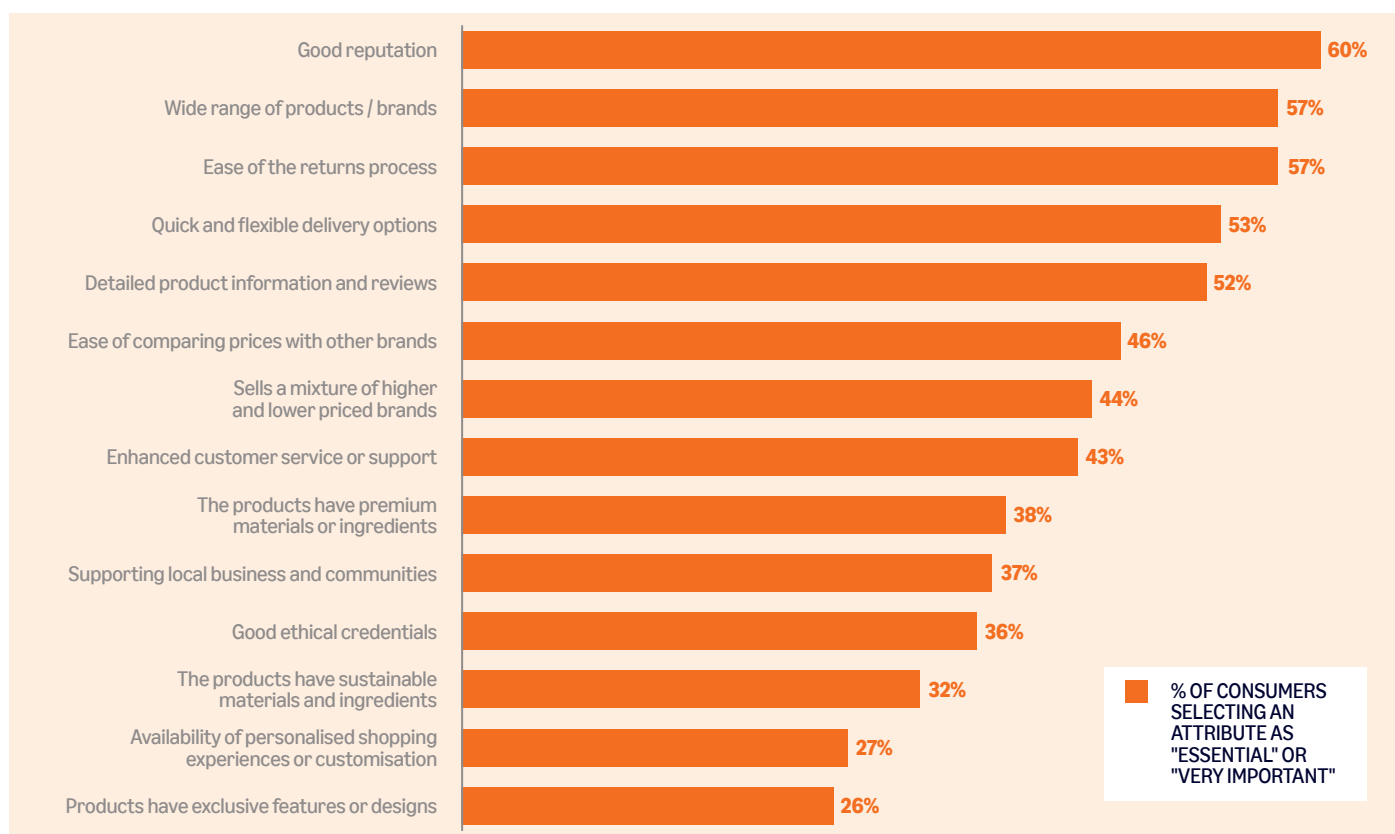


Figure 13: “Shopping online helps me stay connected with the businesses or brands that I like” (% of Irish online shoppers), survey conducted in March 2025



Beyond information access, the expanded choice offered by online shopping empowers consumers to consider a wider range of factors in their purchasing decisions. As e-commerce becomes more prevalent, consumers are developing higher expectations for their online retail experiences. Beyond price and convenience, factors such as a retailer's reputation, ease of returns, and quick and flexible delivery options are becoming increasingly important. The survey found that 60% of respondents cited a good reputation as being “essential” or “very important” when choosing which online retailers to shop with. Similarly, 57% prioritised an easy returns process, while 53% valued quick and flexible delivery options. Other non-price considerations seem less influential in shaping consumer preferences. Only 27% of consumers reported having personalised shopping experiences or customisation to be essential or very important, with over a quarter viewing this as being not very or not at all important (26%). Similarly, only (32%) felt brands using sustainable materials was essential or very important, indicating these preferences are not yet universally paramount in purchasing decisions.

Figure 14: Main reasons for shopping online now and in the future, survey conducted in March 2025



Online shopping can offer consumers greater convenience, saving them both time and effort

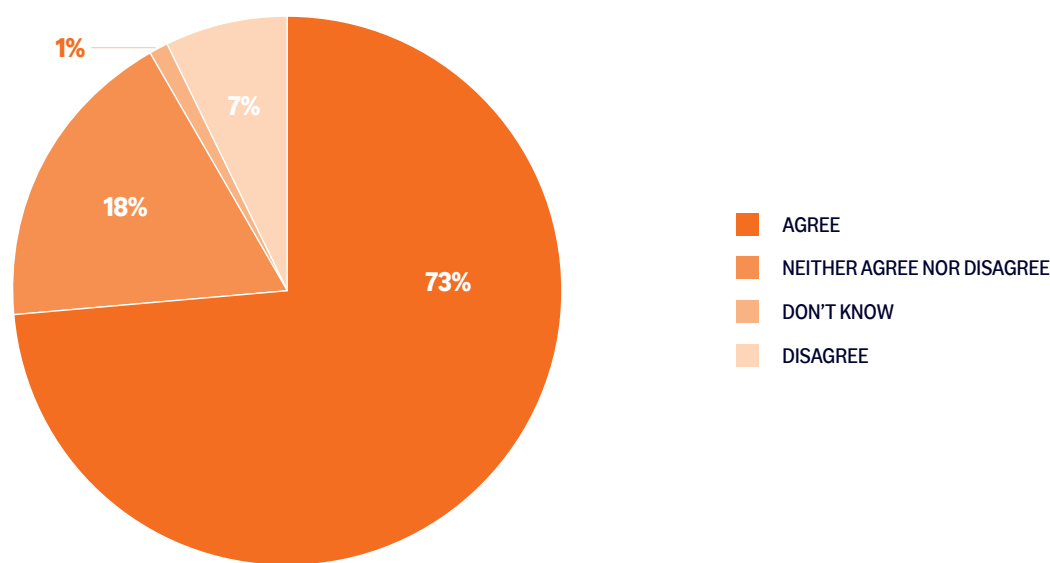
Online shopping gives consumers access to greater choice and information, making the purchasing decision easy and convenient. Furthermore, e-commerce advancements now offer a suite of features at all stages of the shopping experience to ensure that the purchasing process too, is easy and convenient.

Online shops offer consumers a greater flexibility and accessibility in their shopping experience. Beyond breaking down traditional geographical constraints (as highlighted in section 2), e-commerce provides access to a wide range of goods in domestic and international markets and eliminates time constraints. Online, consumers can shop, browse, and compare products anytime, at their own pace, anywhere - whether from home, at work or on the go.

This ability to engage with e-commerce activities—browsing, comparing, and purchasing products—from anywhere and at any time can also translate into time and effort savings for consumers.⁵³ Online websites provide tools that allow for relatively easy and rapid searching, and filtering of product information, across a vast array of brands and retailers. By enabling consumers to conduct all or part of their shopping journey online, from research to purchase, e-commerce can save time and effort (by reducing or eliminating the need for physical store visits for example). E-commerce activities can also enable consumers to optimise their shopping journeys by seamlessly blending their online and in-store experiences for maximum convenience. For instance, by searching online but buying in stores.

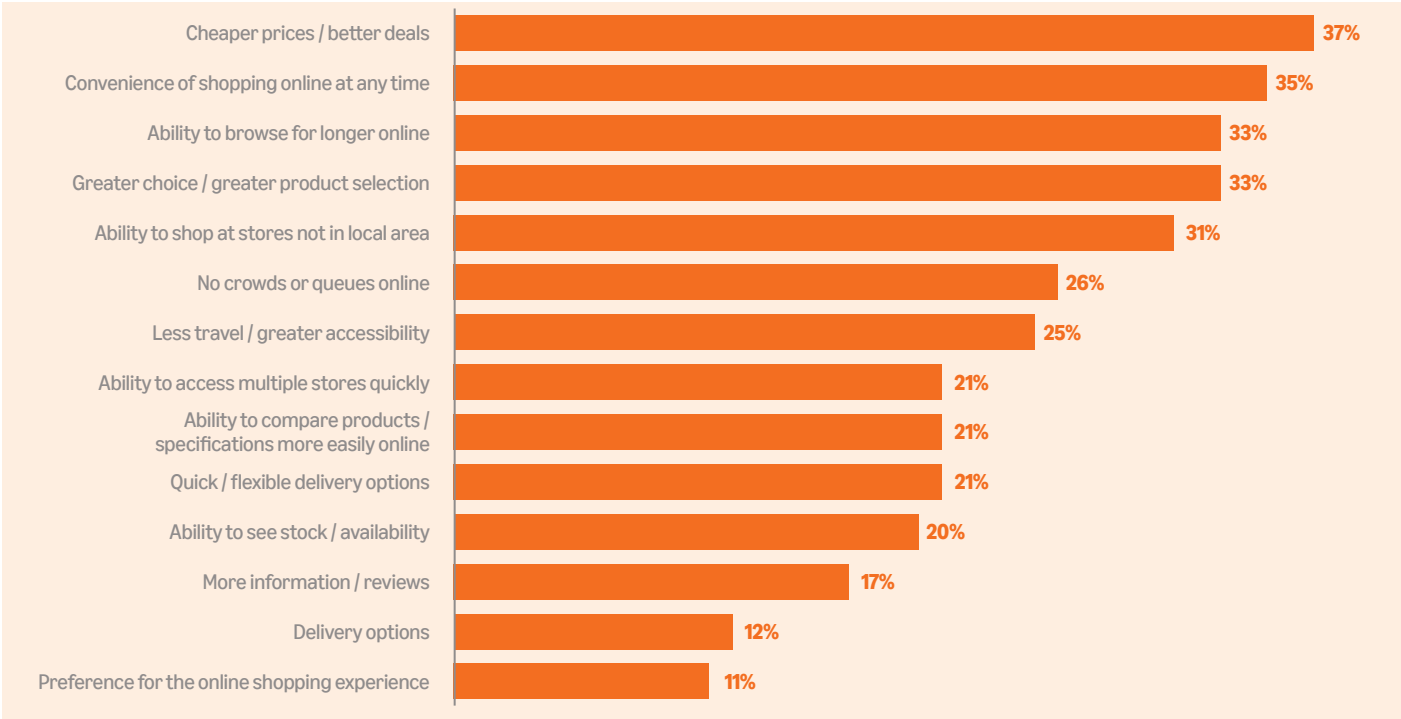
⁵³ Those who shop less online are defined as those who purchase online less than once a month, but at least once a year. Those who shop most are defined as those shopping once a week or more.

Figure 15: “Shopping online saves me time and effort compared to shopping in-store”, survey conducted in March 2025⁵⁴



Findings from the consumer survey echoed the perception of online shopping as a time-saving and convenient alternative to in-store shopping. A majority (73%) of respondents typically agreed that shopping online saved them time and effort compared to traditional retail, as illustrated by Figure 15. Furthermore, when asked about their top five reasons for shopping online, 63% of respondents cited reasons related to convenience and accessibility. As shown by Figure 16, this included 35% of respondents reporting the convenience of shopping at any time, 33% on being able to browse longer before making their purchasing decision, and 25% citing the reduced need to travel (highlighted below).

Figure 16: Primary reasons for shopping online (when respondents selecting top five reasons), survey conducted in March 2025



⁵⁴ Note: The figures in each segment may not sum to 100% due to rounding.

Also, efforts made by online retailers to personalise the shopping experience can further enhance consumer experience. Online retailers are increasingly leveraging data to create personalised shopping experiences, often using purchase history to curate product recommendations tailored to individual preferences. This can streamline the shopping process, helping consumers save time and discover new items aligned with their tastes, enhancing the shopping experience. However, while saved payment details and delivery information enhances shopping efficiency and consumers convenience, it also raises concerns about data privacy and security that necessitate transparent data handling practices and robust consumer protection measures.

Just as consumers’ preferences have evolved, so too have their spending habits. Section 4 explores how consumers’ consumption patterns have changed recently, as well as how they are expected to change in the future, whilst also analysing some of the concerns that consumers raised regarding e-commerce.

Online Shopping by Age Group

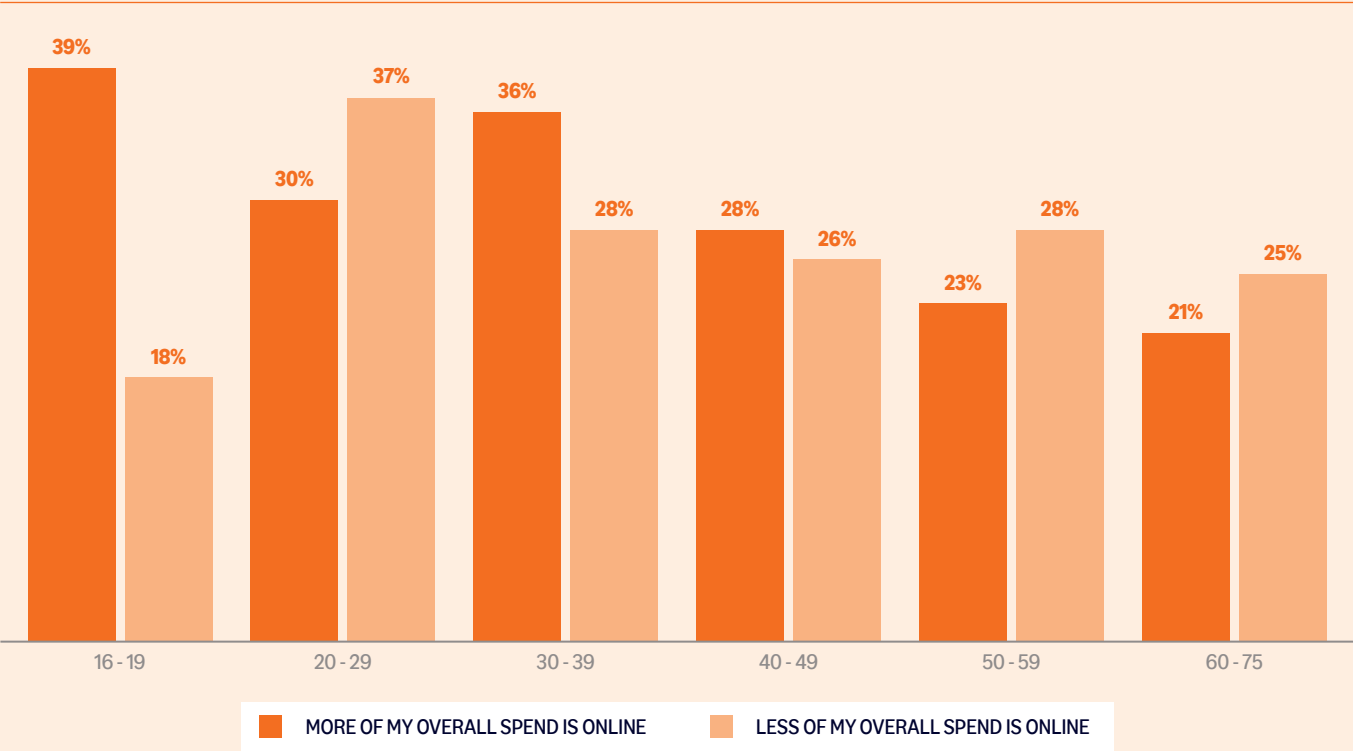
The relationship between consumers and e-commerce varies by demographic, likely influenced by factors such as technological literacy, income, employment status and the presence of children in households.

The Central Statistics Office (CSO) found that middle aged persons shopped the most online⁵⁵ - of those who had used the internet in the last three months, 90% of 30- to 44-year-olds and 91% of 45- to 59-year-olds had made an online purchase in 2024, compared to 49% of persons aged 75 years and over.

These findings were corroborated in the survey - respondents aged 55 to 75 were the least likely (17% of respondents) to shop online at least once a week, whereas those aged 45 to 54 were the most likely (30% of respondents).

When asked how their spending had changed over the last two years, only 22% of 55- to 75-year-olds had seen an increase in their share of spending done online compared to 27% of the same age group who had seen a decrease. On the other hand, 35% of 25- to 44-year-olds had seen increase in their online spending share over the last two years (compared to 29% who saw a decrease).

Figure 17: How has consumers' online spend changed compared to two years ago?, survey conducted in March 2025



⁵⁵ Central Statistics Office. "Internet Purchases and Subscriptions Household Digital Consumer Behaviour 2024 - Central Statistics Office"

4. Evolving consumers habits in the retail digital age

The rise of e-commerce has reshaped the retail landscape, driven by advancements in e-commerce technology and accompanying changes in consumer habits and preferences. What began as basic websites with limited product photos, clunky navigation, and few payment options, has evolved into a sophisticated online ecosystem where consumers expect a seamless and feature-rich shopping experience (e.g. visually rich websites and apps, personalised recommendations, seamless checkout processes and interactive features).^{56,57}

Despite its evolution, consumers still recognise challenges and concerns surrounding online shopping. This, however, may not hinder the growth of e-commerce use in Ireland, as survey respondents anticipate increasing their online spending in the future. This may suggest that benefits of e-commerce outweigh perceived drawbacks for a large proportion of consumers.

Irish consumers are spending more online, however, their pattern of consumption continue to evolve

E-commerce has integrated itself into the retail landscape and continues to capture a growing share of the market. Estimates indicate that the size of the consumer e-commerce market is expected to rise to €8 billion by the end of the decade, up from €5 billion currently.⁵⁸ This projected growth reflects the significant role e-commerce has played in recent years. This is a continuation of historic growth.

Data from the CSO shows that e-commerce has played an increasing role in Irish consumer spending habits in the last two years. In 2023, the majority (78%) of Irish consumers⁵⁹ had made online purchases that year. This figure rose by 7 percentage points to 85% in 2024.⁶⁰ This trend is mirrored in the results from this study's survey, where 28% of respondents stated a shift towards more online spending compared to two years ago (40% reported no change).

This increase in online spending is more pronounced in certain categories of products. Notably, 41% of respondents reported increased online spend on "fashion and accessories," while 32% indicated a rise in online spending on "health and beauty" products. This is in line with wider findings from other European countries. For example, fashion was the biggest sector for UK e-commerce with 26% of all textile, clothing and footwear purchases made online in 2022.⁶¹

While online shopping has gained significant traction among Irish consumers, it continues to coexist with and complement traditional retail

Despite the growth in online shopping, in-store shopping remains a vital aspect of the consumer experience, offering a tangible and interactive experience that complements digital storefronts. Consumers tend to value the ability to physically engage with products, try them on, and seek assistance from in-store staff. Online and in-store shopping are not mutually exclusive, but complementary. They cater to distinct consumer needs and will often both play a role in the consumer's shopping journey. Consumers may gather information in-store but purchase online, or vice versa, highlighting the complementary nature of these channels. Findings from the survey highlight the continued importance of in-store shopping for consumers. While e-commerce is growing, a significant majority (83%) of respondents still frequent physical stores at least once a week, compared to 21% who shop online with the same frequency. In-store shopping is complemented by online shopping.

⁵⁶ Alt (2020). "Evolution and perspectives of electronic markets"

⁵⁷ Kenney et al (2016). "The rise of the platform economy"

⁵⁸ Statista Market Insights. "eCommerce – Ireland". Accessed: March 2025

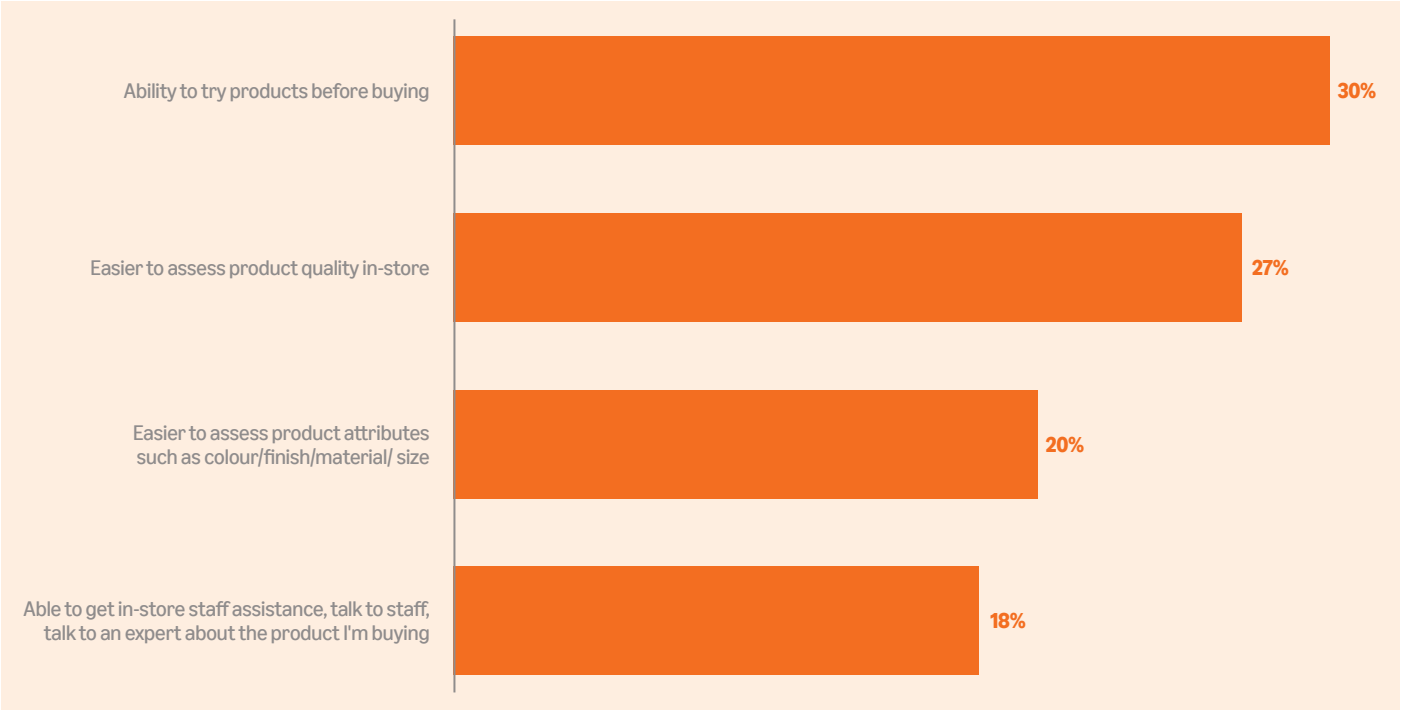
⁵⁹ Irish consumers who had used the internet in the previous 3 months.

⁶⁰ Central Statistics Office (2024). "Internet Purchases and Subscriptions Household Digital Consumer Behaviour 2024".

⁶¹ Forbes. "35 E-commerce statistics for 2024". Accessed: March 2025

An Post⁶² finds that consumers are looking for a mix of online and in-store experiences, Warc⁶³ finds that 41% of consumers prefer a mix of in-store and online shopping. This was mirrored in the survey responses of this study. When asked to identify the top benefits of in-store shopping, consumers highlighted the tangible and sensory aspects of the experience. The ability to try products before purchasing (30%), easily assess product quality (27%), and evaluate product attributes firsthand (20%) emerged as key advantages (Figure 18).

Figure 18: Main benefits of shopping in store (consumers selected top 3), survey conducted in March 2025



Future use of e-commerce is likely to rise, however, there may be challenges to address to achieve this

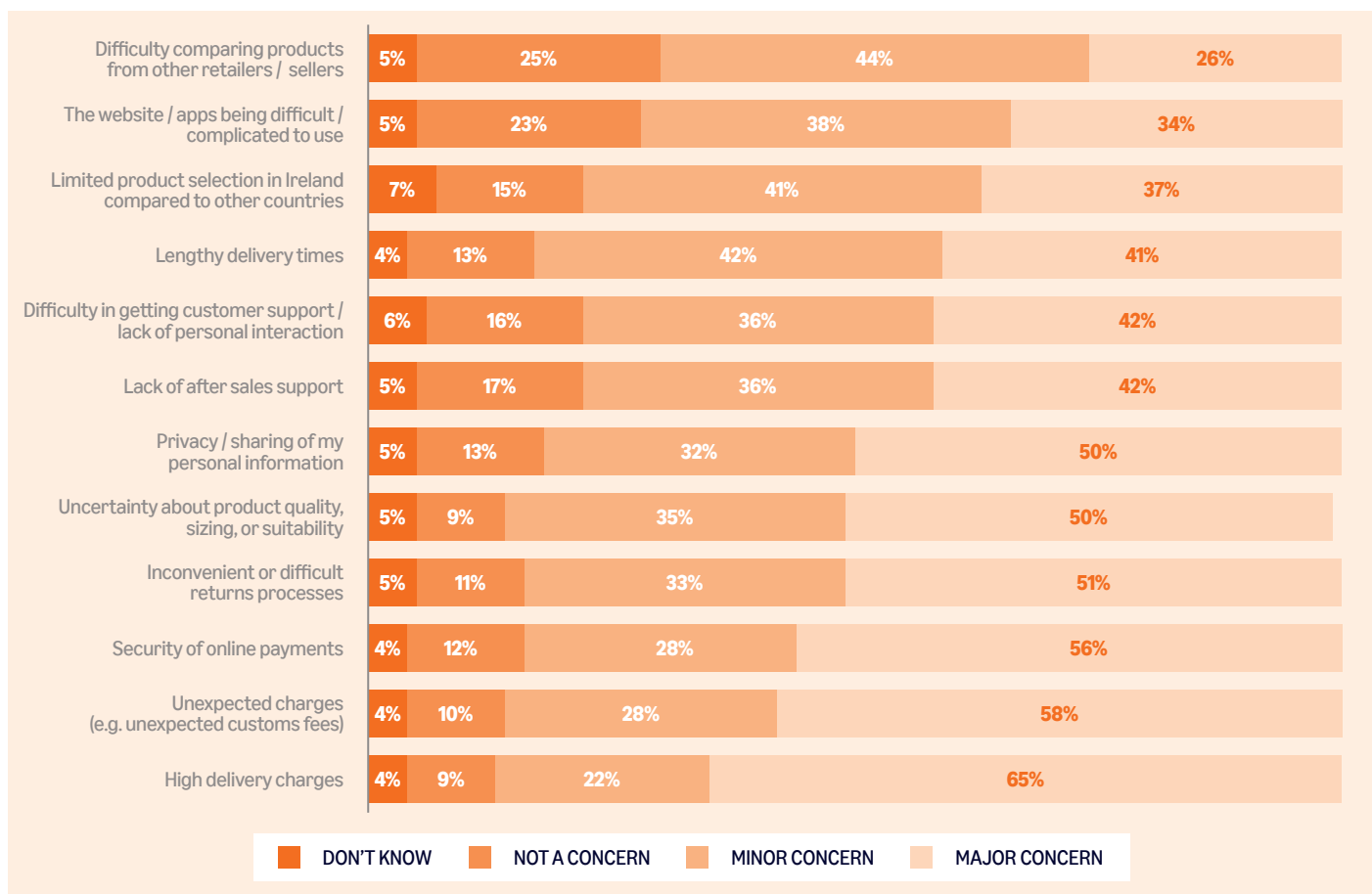
As e-commerce continues to become more prevalent in Ireland, consumers are noticing and navigating a new set of challenges. When shopping online, consumers are most concerned by high and unexpected delivery fees as well as their online security. This is consistent with other parts of Europe also; when surveyed, almost half of UK online shoppers reported that extra fees prevented them from moving forward with their purchase during checkout process.⁶⁴ Despite these obstacles, the trajectory of e-commerce continues upward, with a significant proportion of consumers anticipating an increase in their online spending in the future.

Survey findings reveal that high and unexpected delivery fees, particularly customs charges, are a major concern for Irish consumers, along with online security. Concerns on high and unexpected delivery fees are particularly relevant in the context of post-Brexit trade, as Irish consumers face increased customs duties on goods imported from Britain, with data⁶⁵ showing that customs revenues were 72% higher in 2023 than in 2019. Survey results reflect these concerns, with 65% of respondents expressing significant concern over high delivery charges when purchasing online, whereas only 9% felt that it was not a concern. Also, over half of respondents (58%) worried about unexpected charges, such as customs fees. In contrast, accessibility issues with apps and online platforms were less problematic, with 23% of respondents expressing no concern in this area. These findings underscore the need for transparency and predictability within the e-commerce landscape.

⁶² An Post Commerce. "eCommerce in Ireland". Accessed March 2025.
⁶³ Warc. "41% of consumers prefer a mix of in-store and online shopping". Accessed March 2025
⁶⁴ Forbes. "35 E-commerce statistics for 2024". Accessed March 2025
⁶⁵ Business Matters (2024) "Ireland's Customs Duties Surge by €700m Post-Brexit, Boosting Exchequer Revenues"

Figure 19 provides a more detailed breakdown of consumer perspectives on these challenges.

Figure 19: Consumer attitudes towards e-commerce challenges, survey conducted in March 2025⁶⁶

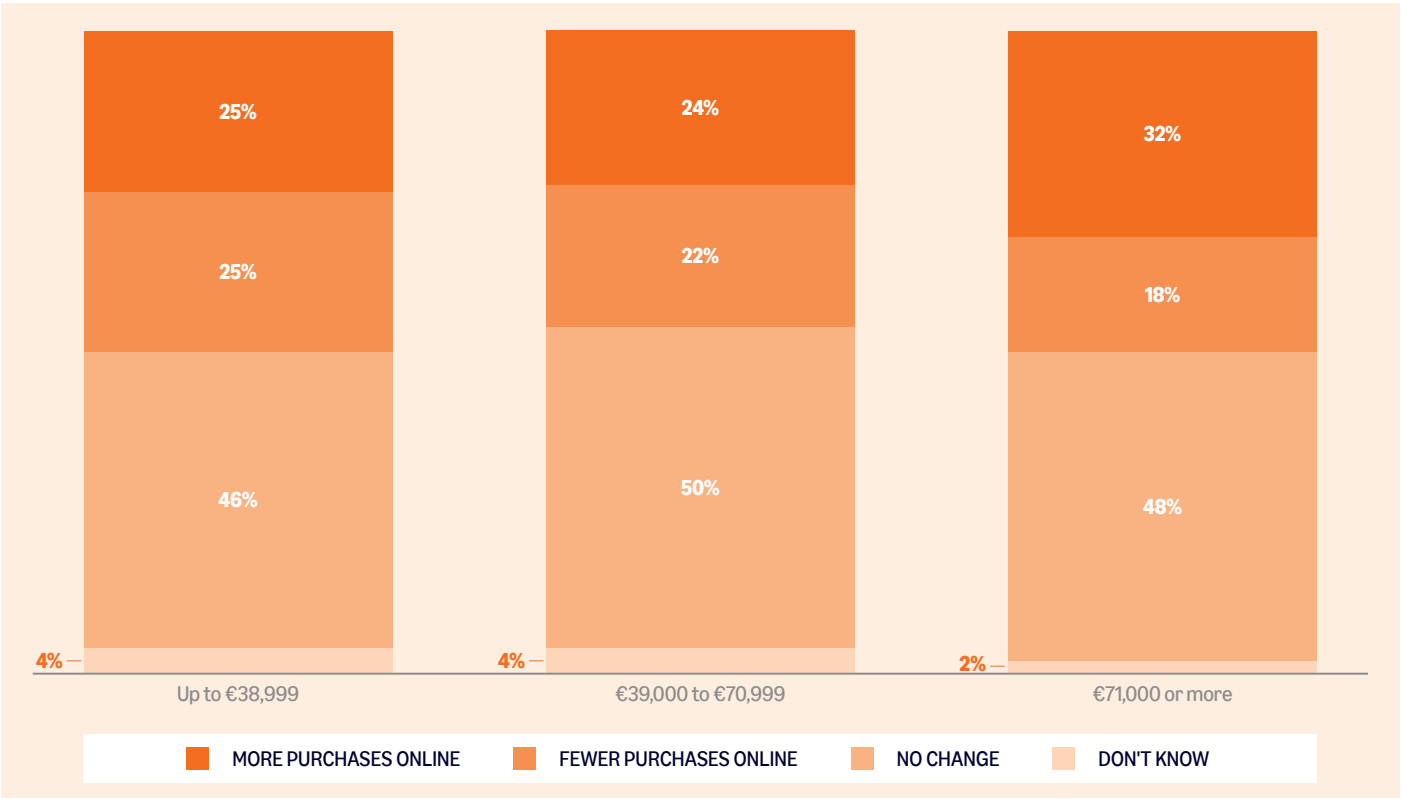


Despite these expressed concerns, e-commerce continues to grow as a substitute and complement to in-store shopping. EY Ireland found that over a third of Irish consumers expected to do more online shopping in the future.⁶⁷ The consumer survey for this study painted a similar picture with 26% of survey respondents expecting to increase their online spending share in the next year (compared to 22% who expected it to decrease). This trend is particularly pronounced among higher-income households, with 32% of those earning €71,000 or more annually anticipating increased online purchases, compared to 25% of households earning up to €38,999 (see Figure 20 for a detailed breakdown). This suggests that while e-commerce appeals to a broad consumer base, higher-income groups may be leading the shift towards greater online spending.

⁶⁶ Note: The figures in each bar may not sum to 100% due to rounding.

⁶⁷ EY Ireland (2024). "Rise of the Independent Consumer as Cost of Living Continues to Top the Agenda"

Figure 20: Consumers' anticipated change in the offline/online split over the next 12 months, survey conducted in March 2025⁶⁸



E-commerce has evolved, and is expected to continue evolving, as a significant part of the consumer shopping experience. Developing consumer preferences indicate that online and in-store shopping will play complementary roles to one another. With rapid growth comes challenges and concerns for consumers, but in light of technological change and business' constant ability to adapt, consumers expect to conduct more and more of their shopping online.

⁶⁸ Note: The figures in each bar may not sum to 100% due to the omission of the "don't know" category.

5. Conclusion

This study provides a comprehensive analysis of the growing online shopping market in Ireland, focusing on its impacts on pricing dynamics and broader consumer behaviour. The findings underscore the multifaceted benefits of e-commerce for Irish consumers.

First, evidence of e-commerce's disinflationary influence for the Irish market were tested and confirmed. Increased online competition and expanded consumer choice contribute to downward pressure on prices, as evidenced by results from the econometric analysis that find a 1 percentage point increase in e-commerce penetration is associated with a 0.05-0.06 percentage point fall in annual inflation. This price advantage is particularly impactful in the current economic climate, where rising inflation poses significant challenges for household purchasing power.

Beyond price impacts, Irish consumers clearly value the convenience, accessibility, and expanded choice offered by online shopping. The survey revealed that over four fifths of respondents agreed that online shopping gave them access to products or brands not available in their local area, and a third indicating that was one of their primary motivations for shopping online. Furthermore, the wealth of information available online empowers consumers to make more informed purchasing decisions, with 70% of online shoppers surveyed indicating product information was easier to find online, although a smaller proportion (57%) felt more informed when shopping online compared to in-store.

The expansion in online shopping and the ability to shopping at any time, from any location, without the traditional time or travel constraints, were also identified as a major benefit by Irish consumers. These impacts were major contributors to consumers saving time and effort whilst shopping.

However, challenges remain. Concerns regarding delivery fees, product returns, and online security underscore the need for continued efforts to enhance trust and transparency within the e-commerce ecosystem.

Looking ahead, the Irish e-commerce market is poised for sustained growth. This study forms a valuable foundation into understanding the impact of online shopping and its benefits, challenges and wider impacts on consumers. As e-commerce adoption and spending continue to rise, these insights will be crucial for businesses seeking to thrive in this dynamic market and for policymakers aiming to foster a fair and competitive retail landscape. Further research exploring barriers to e-commerce depending on demographic characteristics, such as age, will be essential to deepening the understanding of e-commerce's long-term implications for the Irish economy and society.

6. Appendix

Appendix A: Survey of consumers in Ireland

Context

A consumer survey was undertaken to gather insights on the impacts of online shopping on Irish consumers. The survey aimed to shed light on their preferences and behaviours, their own perceptions of online shopping benefits, and highlight past, current or emerging e-commerce trends. The survey was undertaken over a cross-national representative sample of over 1,000 online Irish adults aged 16-75. This was conducted in collaboration with Ipsos Mori in March 2025, with fieldwork occurring over a two-week period. Further details regarding the composition of the sample are documented within the descriptive statistics below.

Descriptive Statistics

Table 2: Consumer Survey Descriptive Statistics

Type	Split	Unweighted Base	Weighted Base	Weighted Base (%)
Sample Size	-	1,019	1,019	100%
Gender	Male	481	503	49%
	Female	538	516	51%
Location	Urban	745	739	73%
	Rural	274	280	27%
Age	16-24	132	155	15%
	25-34	169	170	17%
	35-44	228	215	21%
	45-54	205	193	19%
	55-75	285	286	28%
Working Status	Working	732	690	68%
	Not Working	287	329	32%
Education	Non-Graduates	478	552	54%
	Graduates	531	467	46%
Household Size	1	144	145	14%
	2	269	272	27%
	3+	606	603	59%
Children in Household	Yes	410	400	39%
	No	609	609	61%
Annual Personal Income	< €27,000	350	373	37%
	€27,00-€38,999	206	204	20%
	€39,000- €51,999	162	155	15%
	> €51,999	221	201	20%
Annual Household Income	< €39,000	391	409	40%
	€39,000- €70,999	326	322	32%
	>70,999	244	223	22%

Appendix B: Econometric Analysis

Context

Econometric models (a Eurozone model and an Ireland model) were developed to test the hypothesis that greater e-commerce penetration (i.e. online shopping use) leads to downward pressure on prices. The Eurozone model developed quantitative estimates of the relationship between the rate of e-commerce penetration and rates of inflation at the Eurozone level, validating previous findings from the literature and confirming validity for a similar model for Ireland.

Data & Methodology

Econometric models were used to identify the relationship between inflation and e-commerce penetration. The models account for country-specific factors that influence prices (such as the wage level or interest rate in a country) as well as global shocks that affect prices everywhere (such as the war in Ukraine).

Two models were developed:

- **A Eurozone model** – spanning 18 Eurozone countries, using yearly data from 2002 to 2023.
- **An Ireland model** – an Ireland-specific model using monthly data from December 2018 to December 2024.

The Eurozone model was run to establish an estimate for goods of how e-commerce affects a country’s inflation. The Irish model then aimed to corroborate these findings and identify the impacts of e-commerce on price in Ireland, despite the shorter and turbulent analysis period (i.e. COVID-19 impact). These econometric regressions allow the estimation of the effect of the growth of online shopping on price changes, all else being equal.

The specification of each model is shown within the following tables (Tables 3 and 4), further supplemented by the data sources used for their estimation (Tables 5 and 6). Coefficients of interest are also highlighted. Within each model, the interpretation of the coefficient is as follows: a 1 percentage point increase in the measure of e-commerce is associated with a β percentage point change in annual inflation.

Table 3: Specifications of the Eurozone Model

Eurozone Model	
Model Specification	$Y_{i,t} = \alpha + \beta \Delta ECom_{i,t} + \delta X_{i,t} + \gamma_t + \epsilon_{i,t}$ Where: • $Y_{i,t}$ represents the annual inflation rate • $\Delta ECom_{i,t}$ represents the difference in variable of interest proxying E-commerce, with β the coefficient of interest • $X_{i,t}$ represents a vector of macroeconomic control variables; • γ_t a time-varying trend, consistent across countries; • $\epsilon_{i,t}$ the idiosyncratic error; and • i,t denotes Country i in Year t
Dependent Variable	Annual inflation rate (%)
Proxy of E-commerce	Individual's purchasing online within the last 3 months (%)
Control Variables	Unemployment rate (%); GDP growth (%), nominal wage cost growth (%); the central bank policy rate; the lag of central bank asset growth (%); oil price growth (%); the effective exchange rate, and a time trend.
Granularity	Annual, Panel
Estimator	Fixed-Effects Panel Estimator
Geographical Scope	18 Eurozone Countries
Time Period	2002-2023
Description	A fixed-effects panel estimator is used to remove country-specific fixed effects. The dependent variable is expressed in differences due to non-stationarity (given underlying variable is monotonically increasing over time) therefore annual changes are used.
Pros	• Consistent with literature
Cons	• Independent variable of interest is potentially weak and may correlate with broader development (broader economic development, digitalisation and similar factors). • Broader scope than Ireland

Table 4: Specifications of the Ireland Model

Ireland Model	
Model Specification	$Y_t = \alpha + \beta \text{OnlineTurn}_t + \delta X_t + \gamma_t + \epsilon_t$ Where: • Y_t represents the annual inflation rate • OnlineTurn_t represents the variable of interest proxying E-commerce (represented by online retail turnover, %), with β the coefficient of interest • X_t represents a vector of macroeconomic control variables; • γ_t an annual time trend; • ϵ_t the idiosyncratic error; and • t denotes month t
Dependent Variable	Annual inflation rate (%)
Proxy of E-commerce	Turnover generated by Online Sales (%)
Control Variables	Unemployment rate (%); GDP growth (%), nominal wage cost growth (%); the short-run interest rate; the effective exchange rate, and an annual time trend.
Granularity	Monthly time series
Estimator	OLS Estimator
Geographical Scope	Ireland
Time Period	December 2018 – December 2024
Description	A simple OLS regression is run to identify the relationship. Time-trends are used to remove trend variation. Given online turnover was found to be trend stationary, no differencing was required. Alternative approaches such as developing a vector autoregression model (VAR) were experimented with (to deal with weak autocorrelation present) but not shown (due to poorly estimated coefficients due to a lack of observations). However, these models produced similar results for the coefficient of interest. Therefore, the OLS model is shown for simplicity. Similarly, alternative models were tested using month-on-month and differenced inflation (to tackle non-stationarity). Specifications run also gave statistically significant and negative coefficients for month-on-month regressions, although these were not shown given limited interpretation from monthly inflation impacts. Secondly, similar sign and magnitude coefficients were derived using differenced inflation, further confirming confidence with the primary model.
Pros	• Informative proxy • Directly relevant to Ireland
Cons	• Limited observations over a macroeconomically turbulent period (e.g., COVID-19, Russia-Ukraine War). • Independent variable of interest is a proxy (related to domestic businesses rather than consumers). • Monthly data can cause identification issues (stationarity and autocorrelation).

Table 5: Data used in the Eurozone Model

Data Point	Source
Annual Inflation Rate	Economist Intelligence Unit (EIU)
E-commerce Penetration (Percentage of individuals purchasing online within the last 3 months, %)	Eurostat
Unemployment	Economist Intelligence Unit (EIU)
Constant GDP Growth	Economist Intelligence Unit (EIU)
Nominal Wage Growth	Economist Intelligence Unit (EIU)
Central Bank Assets	European Central Bank (ECB)
Interest Rates	Economist Intelligence Unit (EIU)
Exchange Rates	Economist Intelligence Unit (EIU)

Table 6: Data used in the Ireland Model

Data Point	Source
Annualised Inflation Rates, year-on-year %	Central Statistics Office (CSO)
E-commerce penetration (Retail turnover generated from online sales, %)	Central Statistics Office (CSO)
Unemployment	Central Statistics Office (CSO)
Constant GDP	Central Statistics Office (CSO)
Nominal Hourly Labour Cost Growth	Central Statistics Office (CSO)
Euro Short-term Interest Rate	Federal Reserve Bank of St Louis (FRED)
Euro Effective Exchange Rate	Federal Reserve Bank of St Louis (FRED)
Oil Prices	Federal Reserve Bank of St Louis (FRED)

Findings

Aggregate findings from the Eurozone model are displayed in Table 7. The results show estimated coefficients from models run with varying measures of inflation. The Consumer Price Index (CPI) forms the primary measure of inflation for countries characterising the average price of consumption of goods and services for a consumer, although the basket of goods, and the respective weightings used to measure it across countries differs (it is country-specific). In comparison, the Harmonised Index of Consumer Prices (HICP) forms a consistent measure of inflation across countries, with consistent weights for goods enabling direct comparability across countries.⁶⁹ However, HICP does not consider the consumption habits of a given country. Whilst CPI and HICP form measures of price changes of goods and services, an additional inflation measure was also tested in 'Goods Inflation', forming a HICP measure of goods only.

Coefficients of interest are displayed in tables next to variables next to measures of inflation. The sign and magnitude of the values indicate whether variables, such as change in e-commerce penetration, have an increasing or decreasing effect on inflation, and the magnitude of the effect. Asterisks indicate the level of statistical significance with the highest level of significance denoted by three asterisks, denoting a 1% level of confidence.

Coefficients from the aggregate regressions with this model find a statistically significant and negative relationship between the change in e-commerce penetration over time and inflation (Table 7). These results appear to confirm the hypothesis that greater e-commerce penetration has disinflationary impacts (either slowing the increase in, or even reducing, prices). More specifically, these results indicate that a 1 percentage point increase in e-commerce penetration is associated with a:

- 0.051 percentage point fall in CPI inflation.
- 0.051 percentage point fall in HICP inflation.
- 0.061 percentage point fall in goods inflation.

Further regressions were also run to test sub-indices of goods (Table 8). These regressions do not find robust evidence at the sub-indices level, for the impact of e-commerce except for food, alcohol and tobacco and food and non-alcohol. Negative coefficients were also estimated for Clothing and Footwear, but coefficients were also statistically insignificant. Whilst less informative, these findings are not unexpected when estimated at the annual level, across countries. To develop more sophisticated and reliable estimates, more granular data is likely required to explore quarterly or monthly variations in price.

⁶⁹ Additionally, HICP excludes certain items included in CPI, such as owner-occupied housing costs.

Table 7: Aggregate regressions from the Eurozone Model

Variables	(1) Inflation (CPI)	(2) Inflation (HICP)	(3) Goods Inflation (HICP)
Δ E-commerce	-0.051***	-0.051**	-0.061***
	(0.018)	(0.018)	(0.020)
Unemployment Rate	-0.057**	-0.058*	-0.030
	(0.024)	(0.024)	(0.028)
Constant GDP Growth	-0.041*	-0.041*	-0.058**
	(0.022)	(0.022)	(0.025)
Nominal Wage Growth	0.099***	0.099***	0.065***
	(0.019)	(0.019)	(0.021)
Oil Price Growth	-0.010	-0.010	0.014
	(0.041)	(0.041)	(0.047)
ECB Asset Growth	0.306***	0.306***	0.396***
	(0.041)	(0.041)	(0.047)
Interest Rate	-0.369	-0.370	-0.513
	(0.478)	(0.479)	(0.548)
Exchange Rate	0.558***	0.558***	0.592***
	(0.038)	(0.038)	(0.044)
Observations	355	355	355
R-squared	0.884	0.884	0.884
Countries	18	18	18

Note: Robust standard errors in parentheses: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Table 8: Sub-Indices regressions from the Eurozone Model

Variables	(1) Inflation (CPI)	(2) Clothing & Footwear	(3) Food, Alcohol & Tobacco	(4) Food & non- Alcohol	(5) Furnishings, Household Equipment & Maintenance	(6) Recreation & Culture	(7) Health	(8) Communication
Δ E-commerce	-0.051***	-0.004	-0.053*	-0.071*	0.005	0.003	-0.066	0.064
	(0.018)	(0.027)	(0.029)	(0.031)	(0.018)	(0.020)	(0.042)	(0.045)
Observations	355	355	355	355	355	355	355	355
R-squared	0.884	0.492	0.814	0.845	0.839	0.702	0.338	0.234
Countries	18	18	18	18	18	18	18	18

Note: Robust standard errors in parentheses: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

For the Ireland model, similar findings were found, albeit using a different dependent variable (measure of e-commerce penetration). As shown in Table 9, coefficients of interest were found to be negative and significant. These estimates indicate that a 1 percentage point increase in turnover generated online is associated with a 0.03-0.06 percentage point fall in Irish CPI.

Whilst significant and of a similar magnitude to the Eurozone model, these estimates are not directly comparable given the use of a different dependent variable. However, the similarity of estimates is supportive of the overall hypothesis and confirms the validity of the Eurozone model's findings within Ireland (that the relationship between e-commerce and inflation is likely to still hold).

When assessing sub-indices in Ireland, only four categories were able to be assessed given the process of matching inflation categories (aggregated according to product codes) and measures of turnover generated online (aggregated according to NACE 2 activities otherwise known as economic sectors). This analysis, shown within Table 10, finds a negative and statistically significant association of turnover generated online and clothing inflation over this period. These findings are generally supportive of evidence from the consumer survey which indicated this goods category was most prevalent in terms of consumer purchases.

As highlighted within Table 4, alternative models were also specified to tackle potential identification challenges. Firstly, given potential autocorrelation from using monthly year-on-year changes in inflation, a Vector Autoregressive (VAR) model was specified. Similar coefficients ranging from -0.02 to -0.06 were found for the coefficient of interest. However, given limited datapoints, coefficients for other macroeconomic control variables were weaker when estimated this way (given simultaneous impacts are also estimated for the vector of variables included, and their lags). Secondly, to deal with potential non-stationarity, a model with month-on-month inflation was estimated. This produced negative and statistically significant results, albeit smaller given the assessment of monthly inflation, supporting the main findings. Lastly, a model using differenced inflation was run. Similarly, this also produced negative and statistically significant results, ranging from -0.02 to -0.07 validating the core findings. The results from these estimations of month-on-month inflation as well as variations on measuring year-on-year inflation, in terms of the sign and magnitude of estimates, strongly support the results presented within this study (Table 9 and Table 10).

Table 9: Aggregate regressions from the Ireland Model

Variables	(1) CPI	(2) CPI Excluding Energy and Unprocessed Food	(3) CPI Excluding Housing Costs	(4) CPI Excluding Energy
Online Turnover, %	-0.060***	-0.032***	-0.056***	-0.031**
	(0.019)	(0.011)	(0.020)	(0.012)
Constant GDP Growth	-0.024	-0.059*	-0.006	-0.048
	(0.042)	(0.030)	(0.041)	(0.031)
Total Hourly Labour Cost Growth	0.130	0.076	0.093	0.067
	(0.102)	(0.058)	(0.103)	(0.062)
Unemployment Rate	-0.540*	-0.489**	-0.612**	-0.460**
	(0.305)	(0.218)	(0.305)	(0.222)
Euro Short-Term Interest Rate	0.344	0.601***	0.090	0.709***
	(0.394)	(0.175)	(0.409)	(0.190)
Euro Effective Interest Rate	-0.409***	-0.207**	-0.387**	-0.242**
	(0.153)	(0.096)	(0.157)	(0.100)
Observations	73	73	73	73
R-squared	0.935	0.950	0.927	0.951

Note: Robust standard errors in parentheses: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Table 10: Sub-Indices regressions from the Ireland Model

Variables	(1) CPI	(2) Clothing	(3) Food	(4) Furnishings	(5) Recreation & Culture
Online Turnover, %	-0.060***	-0.047**	0.097	-0.038	-0.007
	(0.019)	(0.018)	(0.134)	(0.023)	(0.031)
Observations	73	73	73	73	73
R-squared	0.935	0.826	0.902	0.930	0.887

Note: Robust standard errors in parentheses: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Caveats and Assumptions

Eurozone Model

- Due to data availability, online shopping penetration was proxied by the % of individuals who had made a purchase online three months prior to being surveyed, which is potentially weak and may correlate with broader development (economic development, digitalisation, and similar factors).
- The scope of analysis is necessarily greater than Ireland to exploit the data and information available within a panel model set-up.

Ireland Model

- Limited data availability for Ireland meant analysis was undertaken on retail turnover generated from online sales (%). This data was only available from December 2018, meaning the period of observation were limited and over a macroeconomically turbulent period (including events such as COVID-19 and an escalation in the Russia-Ukraine War).
- Sensitivity analysis was conducted on the Irish model. This involved the exclusion of the COVID-19 period, the exclusion of the energy price shock period, and the inclusion of an oil price variable. The analysis indicated that the size of the coefficients did not change by much, although the extent and power of the robustness checks run was limited by the small sample size (73 observations) of the data. Removing data for specific periods significantly reduced the already small sample, sometimes leading to statistically insignificant coefficients, even when their magnitude and sign remained consistent. Similarly, adding variables such as the oil price risked overfitting the model given the limited data.
- Whilst the focus of analysis is on consumers, the variable of interest necessarily relates to businesses. However, this variable does give a more detailed view of e-commerce as it denotes volume of spending instead of just individuals making a purchase.
- Analysis is undertaken using monthly data. Whilst more detailed, with greater variation to exploit, monthly data can suffer from autocorrelation and non-stationarity. When testing the stationarity of regressors, they were found to be trend stationary, meaning the inclusion of time-trends was sufficient. When testing for autocorrelation, weak autocorrelation was present. However, when employing alternative time-series models (VECM and VAR), similar coefficients were derived for the variable of interest. Therefore, the OLS regressions are shown for simplicity.

Appendix C: Online Price Index

Context

The online price index was constructed to act as a complement to the econometric models for Eurozone and Ireland, with the intention of observing changes in purchasing power for CPI and online goods.

Wider Literature

Goolsbee & Klenow (2018) found that online inflation for the same categories, was 1% lower than CPI in the period 2014-2017. The European House Ambrosetti (2023) find that between January 2020 and March 2023, the average index of the online basket was 2.56 points lower than the CPI. Similar findings from Jo et al (2019), Charbonneau et al (2017) and Gorodnichenko et al (2018) found that online prices grew at lower rates than offline prices and CPI.

Data & Methodology

The online price index is constructed using a dataset with over 6 million observations of Irish online purchases between 2019 and 2024. The index is calculated by aggregating at a quarterly frequency and developing an index figure which forms the average price, weighted by CPI weightings.⁷⁰ This index figure is correspondingly set to 100 in 2019 to enable comparison with CPI.

The Online Price Index was then compared against the consumer price index (CPI, the primary measure of inflation representing the typical purchase of a consumer). This comparison can be used to identify whether the two observe different trends (both in the level of the index and its growth over time, indicating the relative cost of consumption, and the change in the price of consumption, respectively). These comparisons can be demonstrated both graphically and statistically (using student t-tests, to assess the significance of any observed price series over the same period). This was replicated with constituent good sub-indices, for 11 categories, mirroring those present in the consumer price index to compare in a similar manner.

Descriptive Statistics

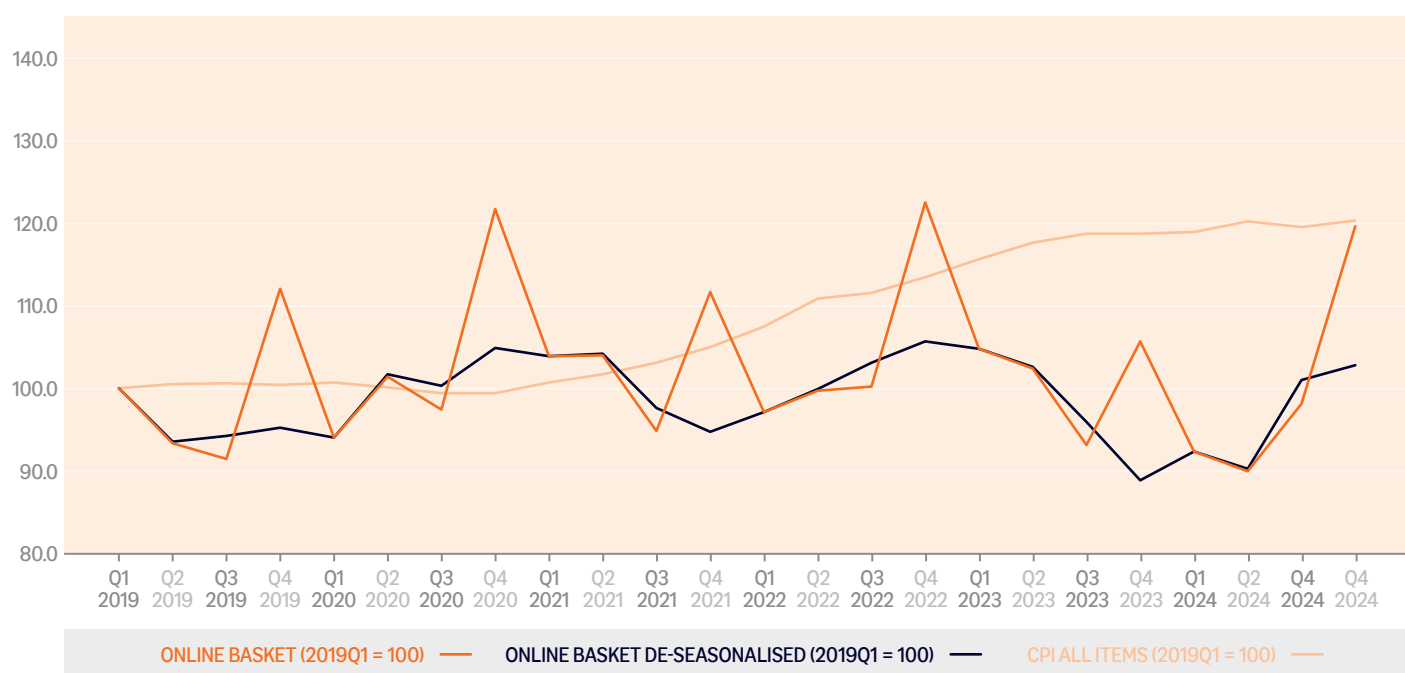
The average value of the online price index over the period considered was 102.1. The corresponding value for the de-seasonalised index was 98.7. Both the values for the online price index and the de-seasonalised index were below the value for CPI at 108.6. The start to end growth rate for CPI was 20.42% compared to the corresponding values for the online price index (19.7%) and de-seasonalised online price index (2.8%).

Findings

The average value of the de-seasonalised online basket was 98.7 over the period considered, compared to the value of CPI of 104.5. A one sided student's t-test was conducted to test if the online basket was lower than CPI over the period considered. This was found to be significant at the 1% significance level.

The sub-indices in the online price index were then compared against the corresponding sub-indices in CPI by use of a student's t-test. The finding column indicates whether the average value of each sub-index was higher or lower than the corresponding CPI sub-index over the period observed. The t-stat and p-value columns are a measure of how unlikely it is that the direction in the finding column occurred by chance. The results of this testing can be seen in Table 10.

⁷⁰ Due to the use of CPI weighting, differences are driven solely by price.

Figure 21: Online Price Index and CPI**Table 11: Results of t-testing on sub-indices**

Sub-index	Finding; was the online sub-index higher (↑) or lower (↓) than CPI?	T-stat	P-value
Alcoholic beverages and tobacco	↓	1.48	7.3%
Clothing and footwear	↓	2.07	2.2%
Food and non-alcoholic beverages	↑	-3.56	<0.1%
Health	↑	-1.34	0.10%
Miscellaneous goods and services	↓	5.59	<0.1%
Recreation and culture	↓	13.5	<0.1%

Caveats and Assumptions

Data structure: The index enables the tracking of fluctuations in the cost of an online basket of goods over time. As the index is constructed from product purchase data, rather than directly from product price data, changes in the index may reflect both changes in product prices and/ or changes in consumer purchasing behaviour.

Seasonality: Due to seasonal variations, affecting both the kind and quantity of goods purchased online, a seasonally adjusted price index was also calculated.

Multi-pricing online: Online retailers often use various pricing strategies, such as delivery fees, service fees (or subscription costs to avoid these), or minimum order values, which can offset lower base prices. These additional costs are often not reflected in the online price index, which is based on price of purchased goods. This potentially masks the true cost of products bought online for consumers. However, this is aligned with the calculation of CPI which similarly excludes delivery fees or transport costs.

