

## Box 6

## EFFECTS OF E-COMMERCE ON INFLATION

**It has been argued that the growth in e-commerce contributes to lower prices and thereby also to lower inflation.** The available empirical evidence so far suggests that the inflation-dampening effect from the growth in e-commerce is limited. However, this finding is surrounded by considerable uncertainty owing to limitations in the data.

### The potential impact of e-commerce on prices and inflation

**The term “e-commerce” typically refers to the purchase or sale of goods or services carried out by means of an electronic network, such as the internet.** Internet-based transactions have become more widespread in both retail and business-to-business markets.

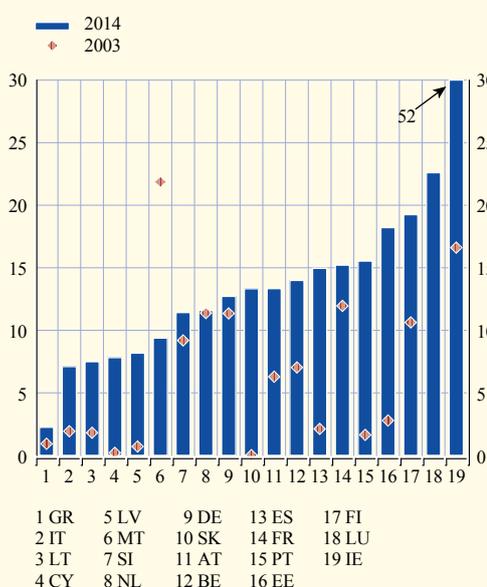
**There are two key ways in which the growth in e-commerce may bring down prices.** First, compared to the standard brick-and-mortar-based distribution channels, e-commerce provides scope for cost savings in the wholesale and retail markets, which both traditional and online retailers can pass on to their customers. Second, e-commerce can be effective in lowering prices as a result of increased competition among suppliers, as customers can conveniently search the internet for better bargains and thus force both traditional and online suppliers to keep their prices low. The latter effect may reduce profit margins. It is worth noting that in both cases, the lowering of prices can even take effect when the market share of e-commerce is still relatively low.

**The potential effect of the growth in e-commerce on inflation would only be sustained until the spread of e-commerce has stabilised throughout the markets, which could take a prolonged period of time.** Online-based transactions are a new technology to which markets must gradually adjust. During this process, price pressures may moderate, but the impact can be expected to lessen once a new equilibrium is established.<sup>1</sup>

### The use of e-commerce in the euro area

**Over the past ten years, the share of electronic sales to consumers and businesses in total turnover has increased in most euro**

Chart A Electronic sales by enterprises as a percentage of total turnover



Sources: Eurostat and the European Commission.

Notes: All enterprises excluding financial sector companies (with ten or more persons employed). Business-to-business and business-to-consumer sales are included. The first observation refers to 2004 for DE, EE and LT; to 2005 for CY, LV and SK; to 2006 for SI; to 2007 for NL; and to 2008 for MT and FR. The latest observation refers to 2012 for BE and 2013 for SI. Data for LU are available for 2012 only.

<sup>1</sup> Meijers, H., “Diffusion of the internet and low inflation in the information economy”, *Information Economics and Policy*, Vol. 18, 2006, pp. 1-23.

area countries, but it still varies significantly across them (see Chart A).<sup>2</sup> Companies in the small and open economies of Ireland, Luxembourg, Slovakia and Finland posted the highest share of electronic sales in 2014, followed by companies in Germany, France, Belgium and Spain. The share of electronic sales in 2014 was still comparatively low in Greece, Cyprus, Italy and Malta, as well as in Latvia and Lithuania, with values below 10%. A particularly notable increase in electronic sales, from low starting levels in 2003, took place in the latest countries to have joined the euro area (Cyprus, Slovakia, Estonia, Lithuania and Latvia), which have seen a significant expansion in high-speed internet coverage, as well as in Spain and Portugal.

The lower presence of e-commerce in some countries may be partly explained by a considerably larger share of small and medium-sized firms, which generally tend to sell less online than larger companies. Furthermore, also in terms of internet access, some countries are lagging behind other euro area countries in terms of “very fast” internet access.

The share of individuals using the internet to obtain information on goods and services or make purchases online has increased considerably over the past ten years (see Charts B and C). In all euro area countries except Italy, the percentage of people seeking information online exceeded 50% by 2014. By that time, also the share of individuals actually buying goods and services online had at least doubled in most euro area countries compared to 2003.

**Chart B Percentage of individuals looking for information about goods and services online**



Sources: Eurostat and the European Commission.  
Notes: Individuals aged 16-74. The first observation refers to 2004 for CY, SI, SK, EE and LV; to 2005 for BE, IT and MT; and to 2006 for FR.

**Chart C Percentage of individuals ordering goods and services online**



Sources: Eurostat and the European Commission.  
Notes: Individuals aged 16-74. The first observation refers to 2005 for BE, IT and MT; and to 2006 for FR.

2 Public data on e-commerce are still scarce. One data source is Eurostat’s annual survey on ICT usage in enterprises and in households since 2002, which includes questions on e-commerce and supports the European Commission’s Digital Agenda for Europe, launched in 2010.

### Evidence of the impact of e-commerce on inflation

**There are a number of caveats when examining the impact of e-commerce on consumer price inflation.** One of these is related to the inclusion of online price developments in the HICP. Statistical institutes in the EU increasingly include online prices when calculating consumer price indices. For some items, such as prices for hotel and other accommodation services as well as airfares, the collection and use of prices available on the internet instead of or in addition to those from traditional travel agencies or sales points is already well established. At the same time, the inclusion of prices for manufactured goods is more diverse across statistical institutes, also reflecting different consumption habits.<sup>3</sup> Eurostat, together with national statistical institutes, is currently working on a better, more complete and harmonised way to capture online price developments in the compilation of the HICP.

**When a statistical institute incorporates more online traded goods and services in the HICP, it has an impact on HICP inflation to the extent that the prices of such products and services change at different rates to the prices of offline-traded goods and services.** If prices change at similar rates in both trade channels, the incorporation of online traded products would not impact HICP inflation noticeably. Increasing quantities bought via the internet and price level differences between online and offline shops are reflected in adjustments to the expenditure shares of the respective HICP sub-items.

**Available evidence on the existence of a measurement error in the consumer price indices due to the incomplete incorporation of online sales is scarce and inconclusive.** Lünemann and Wintr (2006)<sup>4</sup> analyse a large set of micro price data and find changes in prices of products traded online to be, on average, smaller than the corresponding price changes reported in the consumer price index data – this would point to a possible measurement error in HICP inflation. By contrast, a more recent study by Gorodnichenko, Sheremirov and Talavera (2014)<sup>5</sup> finds that prices are, on average, adjusted in online shops by about the same amount as in offline shops. Thus, the measurement error in a price index by excluding online sales should be small.

**Evidence of actual effects of e-commerce on consumer price changes is also scarce but points to a small effect on inflation.** An older study by Yi and Choi (2005)<sup>6</sup> finds that an annual increase by 1 percentage point in the share of people using the internet decreases the annual inflation rate in the range of 0.04-0.1 percentage point. This outcome is broadly in line with more recent results published by Lorenzani and Varga (2014)<sup>7</sup> who estimate the impact of online purchases of goods and services when examining the degree of price competition. In this context, they project the share of online purchases of goods and services in the retail sector observed in the year 2010 further up to 2015, and estimate that such a development could, overall, lower price increases in the retail sector in the EU27 as a whole by 0.1 percentage point each year between 2011 and 2015. A considerable level of uncertainty surrounds such estimates, inter alia, owing to the limited data sample available and previously mentioned caveats in compiling consumer price

3 For more information on inflation measurement issues, see Box 2 entitled “Implications of developments in the retail trade structure for inflation measurement”, *Structural Issues Report*, September 2011, ECB.

4 Lünemann, P., Wintr, L., “Are internet prices sticky?”, *Working Paper Series*, No 645, ECB, June 2006.

5 Gorodnichenko, Y., Sheremirov, V., Talavera, O., “Price setting in online markets: does it click?” *NBER Working Papers*, No 20819, August 2014.

6 Yi, M.H., Choi, C., “The effect of the internet on inflation: Panel data evidence”, *Journal of Policy Modeling*, Vol. 27, 2005, pp. 885-889.

7 Lorenzani, D., Varga, J., “The Economic Impact of Digital Structural Reforms”, *European Commission Economic Papers*, No 529 September 2014.

index. More conclusive evidence is available for the United States in the context of “The Billion Prices Project” by the MIT and its regularly updated price statistics on offline and online price developments.<sup>8</sup> These data suggest neither marked nor systematic differences between price indices or price inflation for online and traditionally-traded goods in the United States.

<sup>8</sup> See “The Billion Prices Project” webpage at <http://bpp.mit.edu/usa/>