Distance Selling, Internet and Price Dynamics

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Abstract

The share of retail sales made via distance selling has increased steadily, driven by Internet sales. Meanwhile, a large body of research has been devoted to measuring the impact of online shopping on consumer prices. These studies are based primarily on microeconomic data and they reveal contrasting effects due to diverging microeconomic behaviours. This paper aims to use a macro-sector estimation to show how the price-decreasing effects of Internet shopping outweigh the price-increasing effects. In that purpose, we use French price index series and distance selling sales covering about 30 sectors, from 1990 to 2007. We find that downward effects dominate: the recent development of distance selling, due to the development of online selling, results in lower prices.

Keywords: e-commerce, price, competition

JEL CODE: D12, E31, L8

Résumé

Essentiellement portée par le commerce en ligne, la vente à distance s'est considérablement développée ces dernières années. De nombreuses études cherchent à mesurer l'impact de ce développement sur les prix à la consommation. Exploitant pour l'essentiel des données microéconomiques, elles mettent en avant des effets contrastés. Cet article propose de recourir à une estimation macro-sectorielle pour montrer dans quelle mesure les effets à la baisse d'internet sur les prix à la consommation domineraient les effets à la hausse. Nous mobilisons pour cela des séries françaises d'indice de prix et de chiffre d'affaire de vente à distance sur une trentaine de secteurs, de 1990 à 2007. Nous obtenons que la hausse de la part de la vente à distance est associée à une baisse des prix sur la période 1990-2007.

Mots clés : e-commerce, prix, concurrence

Codes JEL : D12, E31, L8,

1. Introduction

The share of retail sales made via distance selling has increased steadily, driven by Internet sales. Meanwhile, a large body of research has been devoted to measuring the impact of online shopping on consumer prices. These studies are based primarily on microeconomic data and they reveal contrasting effects due to diverging microeconomic behaviours. Indeed, the greater flexibility of markets introduced by Internet selling should drive down prices, but this effect is balanced by the weak price elasticity of demand and limited competition between distribution channels. This paper aims to use a macro-sector estimation to show how the effects of Internet shopping that reduce consumer prices outweigh the effects that increase them.

Online shopping should drive prices down in three ways. First, online selling would reduce costs, particularly transaction costs, and thus ultimately reduces the prices charged to end consumers (Ellison and Ellison 2005). Secondly, the wider availability of price and product information, along with the emergence of automated price comparison sites, would stimulate competition, leading to lower prices (Bakos 1997). Thirdly, the Internet would make it easier to change price menus, thereby reducing price stickiness. Some research measures the impact of the Internet on market flexibility by comparing online prices with prices offline, as well as the frequency with which prices are changed. For example, Brynjolfsson and Smith (2000) found that online prices for CDs and books were 9% to 16% lower than prices in conventional distribution circuits and that prices changes were smaller and more frequent online, while Larribeau and Pénard (2002) found similar results for CD prices based on French data. On the other hand, Bakos et al. (2005) looked into simultaneous online and offline price developments in the brokerage market. They described how competition between distribution channels led to convergence on a lower equilibrium price.

However, this competition effect seems to be limited in light of the dispersion of online prices. As Brynjolfsson and Smith (2000) have shown with the book and CD market and Carlton and Chevalier (2001) have shown with the perfume market, this dispersion is significant. Part of the reason could be specific online marketing strategy based on loss-leader pricing, described by Ellison and Ellison (2009), along with the weak price elasticity of demand. In a comparative study of book sales by Barnes and Noble and by Amazon, Chevalier and Goolsbee (2003) found that the price elasticity of demand is weak when the distributor enjoys a degree of brand recognition. According to Brynjolfsson and Smith (2001), even consumers using shopbots to compare prices are willing to pay between $1.50 and $2.00 more for a book from a reputable distributor rather than from an unknown distributor. Moreover, the "Long Tail" phenomenon, described by Brynjolfsson et al. (2009), means that more niche products are distributed online which reduce competition with conventional distribution for such products.

Finally, some of the research underlines the complexity of relationships between online sales and sales in shops, which produce different effects on prices, depending on the markets. Forman et al. (2009) find a substitution effect between online and offline selling which seems to promote "competition", but online shopping increases with the distance between the buyer and the physical points of sale, which means there are also complementary effects. This can be seen in conventional retailers' development of Internet selling and online retailers' development of bricks-and-mortar outlets. Furthermore, as Carlton and Chevalier (2001) have shown for the DVD and perfume markets, manufacturers control the online supply in order to limit competition.

Based on macroeconomic data, including price index series covering several years and several sectors, this paper estimates the aggregation of the possible effects of online shopping on prices. Moreover, as price index series include online prices, this paper assesses the impact of the development of the internet on simultaneously online and bricks-and-mortar prices. We obtain a significant effect on prices of the development of internet on prices.

Since detailed longitudinal data on Internet selling are not available, our work is based on data relating to all distance selling. However, the statistics for different major categories of goods show that online shopping is a key driving force behind recent developments in distance selling. The data used are the sales figures for distance selling in France and changes in price indices. These two variables are available for some thirty different goods, ranging from women's undergarments to technological goods. All in all, these goods account for about half of the value of the consumer price index published by INSEE and the relevant data cover two decades.

The method used is an analysis of panel data over seventeen years, including the period when online shopping emerged in France. We both consider the level and the dynamics of distance selling. We find that the distance selling share of total consumption of a given good as a significant impact on its price. This impact increases with the share of web surfer in the total population.

The organisation of this paper is as follows. In the second section, we describe the data used and expose the dynamics of distance selling and the role of the Internet. In the third section, we present our econometric strategy with details about the two transmission hypotheses and our results. The fourth section is devoted to testing the robustness of these results. Our conclusion outlines the macroeconomic consequences.

2. Data description

Our paper is based on data from the French Distance Selling Federation. After detailing these data, we describe the past evolution of distance selling in France. We show that internet has contributed a lot to the recent resurrection of the sector. Finally, we give information on the INSEE price index.

2.1. Distance-selling data

The French Distance Selling Federation (FEVAD) collects and disseminates data on the distance selling sector. FEVAD members include more than 350 distance selling businesses in catalogue, Internet and telephone sales, along with nearly 600 websites, including 14 of the 15 most visited e-commerce sites in France (source of audience ranking: Médiamétrie/NetRatings). All in all, FEVAD members account for more than 95% of distance selling sales. FEVAD's detailed data are based on exhaustive surveys of its members and are therefore representative of the entire distance selling sector in France.

Through the partnership between the Banque de France and FEVAD, we had access to distance selling sales figures for 35 products in 9 main product categories from 1975 to 2006 (see Table 1). Taken together, these products account for nearly half of the households' consumption (49.45% in 2006)

Table 1: Distance selling share of households' consumption and distance selling market share for 35 products in 9 categories

		Weight in total consumption (total = 10 000)	Distance selling market share, %		
		2006	1990	2000	2006
1	**Clothing**	**380**	**6.3**	**9.7**	**8.8**
11	Overwear	145	5.0	10.0	9.4
111	Men overwear	51	1.8	3.8	4.6
112	Women overwear	94	7.8	14.1	12.0
12	Underwear	136	7.9	10.5	9.6
121	Men underwear	50	5.9	5.8	5.4
122	Women underwear	86	9.3	13.5	12.1
13	Sportwear	35	20.8	10.2	6.7
14	Child wear	64	4.7	6.8	6.9
2	**Household textiles**	**45**	**15.9**	**17.0**	**20.8**
21	Bedclothes	17	18.9	31.0	44.0
22	Curtains and furniture textiles	11	13.5	14.3	12.7
23	Wool and fabric	2	11.2	14.3	23.4
3	**Footwear and leather**	**125**	**1.9**	**2.1**	**3.4**
4	**Clocks and jewels**	**73**	**1.9**	**1.8**	**4.2**
5	**Food and non alcoholic beverages**	**1638**	**0.1**	**0.1**	**0.4**
6	**Home equipment**	**599**	**2.3**	**2.2**	**2.6**
61	Furniture	150	1.0	0.6	0.6
62	Domestic appliance	92	2.4	3.8	5.3
63	Bed furniture	38	13.9	15.8	24.3
64	Decoration	9	8.4	6.4	6.5
7	**Health and beauty**	**1165**	**0.6**	**0.7**	**0.7**
8	**Recreation**	**913**	**3.1**	**2.8**	**4.0**
811	Articles de quincaillerie, fournitures de bricolage	4	4.0	4.8	14.6
812	Games	44	3.4	4.4	5.1
813	Books	42	15.4	19.1	23.9
814	Writing equipment	14	3.1	1.1	0.0
815	Newspaper and magazine	82	1.4	1.6	1.9
816	Electronic equipment (photo, computer, etc.)	203	2.9	3.1	6.5
817	Sound and image equipment	53	4.2	4.9	8.4
818	Gardening	47	1.4	1.5	0.5
820	Garden furniture	4	6.7	4.1	5.8
821	Horticulture	64	1.5	3.1	2.2
822	Sport and moto/car equipment	79	1.5	0.8	1.2
9	**Childcare**	**7**	**6.2**	**5.1**	**6.7**

Distance selling trends vary greatly depending on the product categories and the Internet effect is very different, depending on the products. For some categories, such as food or recreation, the Internet has caused explosive growth of distance selling, whereas it has substituted itself for other distance selling channels in other product categories, such as clothing.

**Figure 1: Change in distance selling sales for 9 product categories from 1990 to 1998 and from 1998 to 2006**

■ 1990-1998 ■ 1998-2006
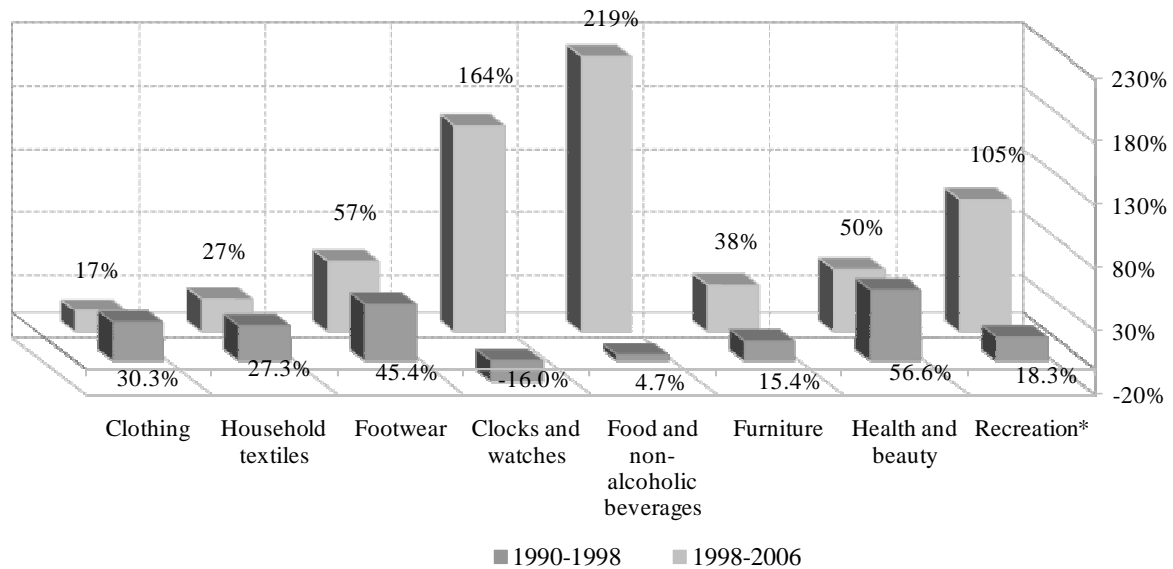
* Including computers

Figures for 2007 and 2008 not available

2.2 The dynamics of distance selling

The aggregated data show three distinct periods for distance selling in France (Figure 2).

Figure 2: Distance selling sales of products in billions of constant euros from 1975 to 2008
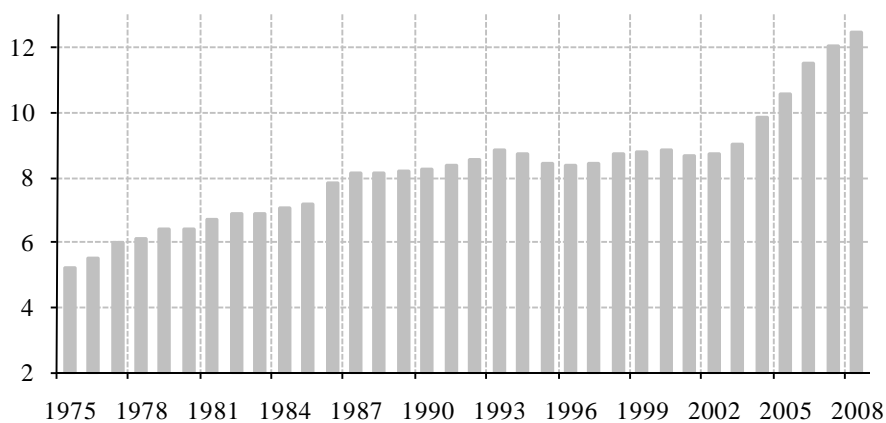
In constant euro terms, distance selling enjoyed a decade of rapid growth starting in 1975. At the time, distance selling benefited from the catalogue effect. Consumers faced with high inflation were reassured by catalogue prices that were guaranteed for an entire season. Distance selling prices were competitive and stable.

This mechanism was inverted in the decade from 1985 to 1995, when consumer prices fell sharply. The growth of chain stores, with promotional sales strategies, along with the falling prices and increasingly rapid obsolescence of technological goods meant that fixed catalogue prices became a handicap. Despite strategies to win customers back and discounts offered via minitel, the distance selling market share started to decline in 1993 (Figure 3).

Figure 3: Distance selling market share from 1975 to 2008
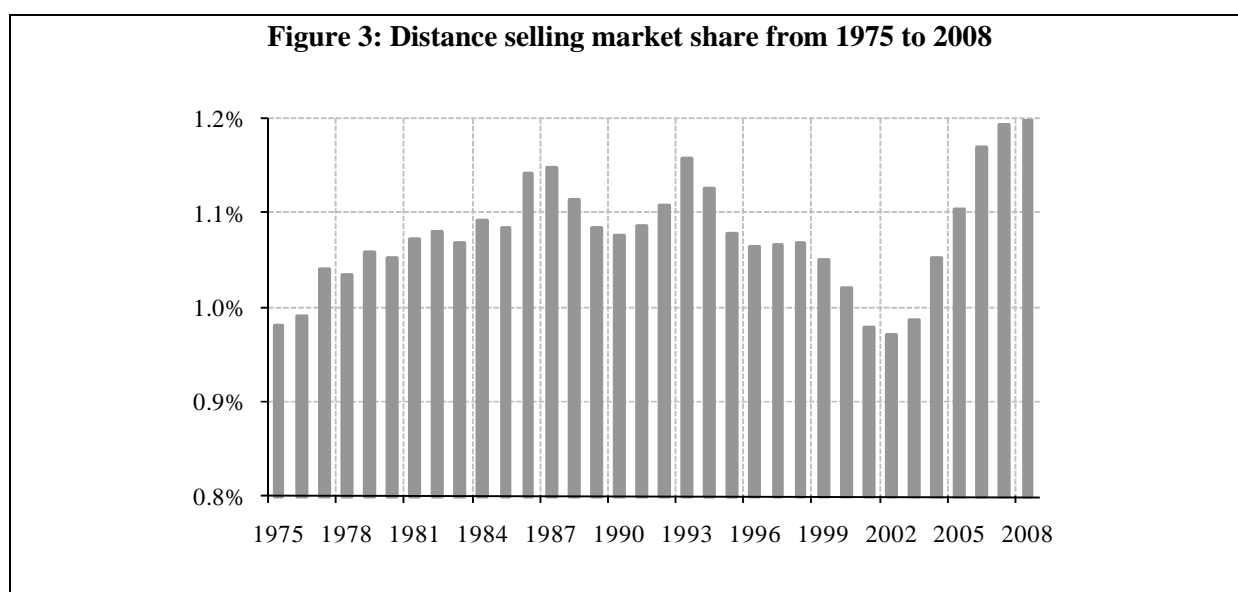
Contrary to the common perception, distance selling has been enjoying a renaissance since the beginning of the new century, with stronger growth than in the nineteen-seventies, despite the recent problems encountered by such historic players as Camif. The shift occurred as online shopping took off.

2.3. Growth of online sales and distance selling: substitution or driving force?

The French Distance Selling Federation, FEVAD, also estimates online sales figures for major product categories. These data do not provide a statistically significant number of observations, but they allow us to infer the type of relationship between the growth of online shopping and the growth of distance selling in general. Figure 4 shows the change in overall distance selling sales, with the Internet and without the Internet. For 2007 and 2008 data, as only total online sales figures are available (including

products and services), we make the assumption that the share of online sales of products is constant from 2006 to 2008 (52%). The first thing we see is that the strong growth of online shopping since 2000 is associated with a decline in distance selling, which suggests a substitution effect. A similar analysis of major product categories bears out this observation. Online shopping, compared to mail-order, offers time savings, user friendliness and easier access to information.

Yet, the growth of online shopping involves much more than mere substitution; it appears to be a driving force for the recovery of distance selling, which posted growth rates that were higher than those seen in the nineteen-seventies. The buyer's location is a determining factor in the choice of online shopping, as it is for conventional distance selling (Forman, Ghose and Goldfarb, 2009), but online shopping in some market segments is also winning over consumers who live near bricks-and-mortar distributors. One example is food sales, where online shopping has shown strong growth, even though it is still marginal. Online merchants in this sector are primarily urban and their prices are sometimes higher than those of conventional shopping and include delivery costs[4]. For consumers, the Internet offers a smaller selection, but it provides additional services, such as access and delivery, for an additional cost. For distributors, the Internet means that consumers handle many of the costly intermediation processes themselves, such as entering their orders directly into the distributor's computer system and making online payments. Online selling also ensures that supply meets demand and reduces menu costs.

Figure 4: Distance selling sales of products in constant euros from 1996 to 2006

Other distance selling sales in constant euro
Online sales in constant euro
Total distance selling sales in constant euro

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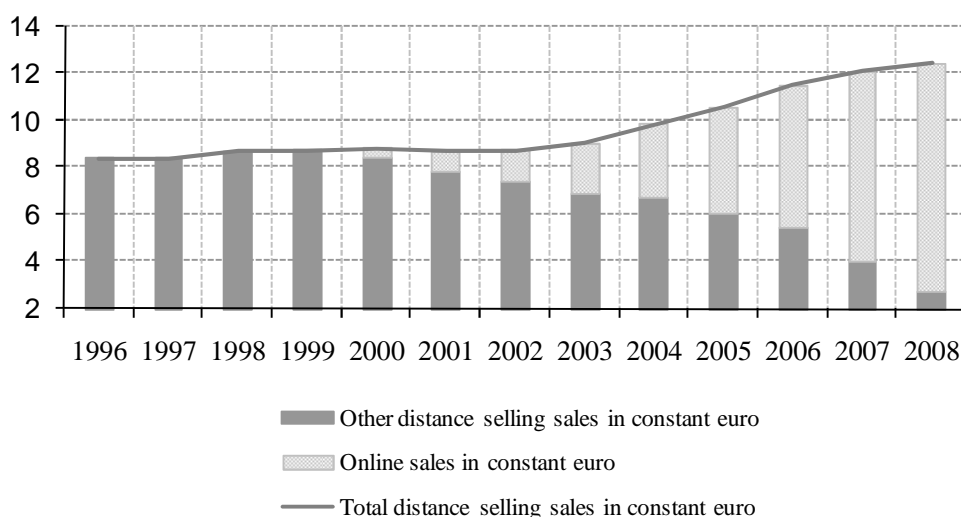
[4] There are major price disparities between merchants in this sector. The LSA barometer using a single reference shopping basket shows a price difference of 15% between the online merchant with the lowest prices and the most expensive online supermarket.

2.4. INSEE data

To compile its price index INSEE tracks a sample of more than 100,000 basic products obtained by observing 1,000 varieties, such as a child's winter trousers, three-star brandy or a tanning salon session, in about one hundred towns and cities. The definition of a variety is necessarily subject to statistical arbitrariness. This means that its composition may change (for example, the shares of multigrain breads and baguettes in ordinary bread), which gives rise to quality effects that are assumed to be correctly taken into account by INSEE, using hedonic price methods. It is important to point out that this consumer price index combines conventional distributors' prices with distance selling prices, which makes it possible to measure the simultaneous effect of the Internet on consumer prices, regardless of the distribution channel.

For the purposes of this study, we have used price indices for some thirty families of products. Each family of products is obtained by aggregating varieties. We know that the consumer price index for a family of products is calculated by chaining Laspeyres indices where the basket of goods is revised annually. This provides us with the relevant consumer price index for each family of products covered by the FEVAD data. Figure 5 shows the average annual rate of inflation for the nine product categories from 1990 to 2007.
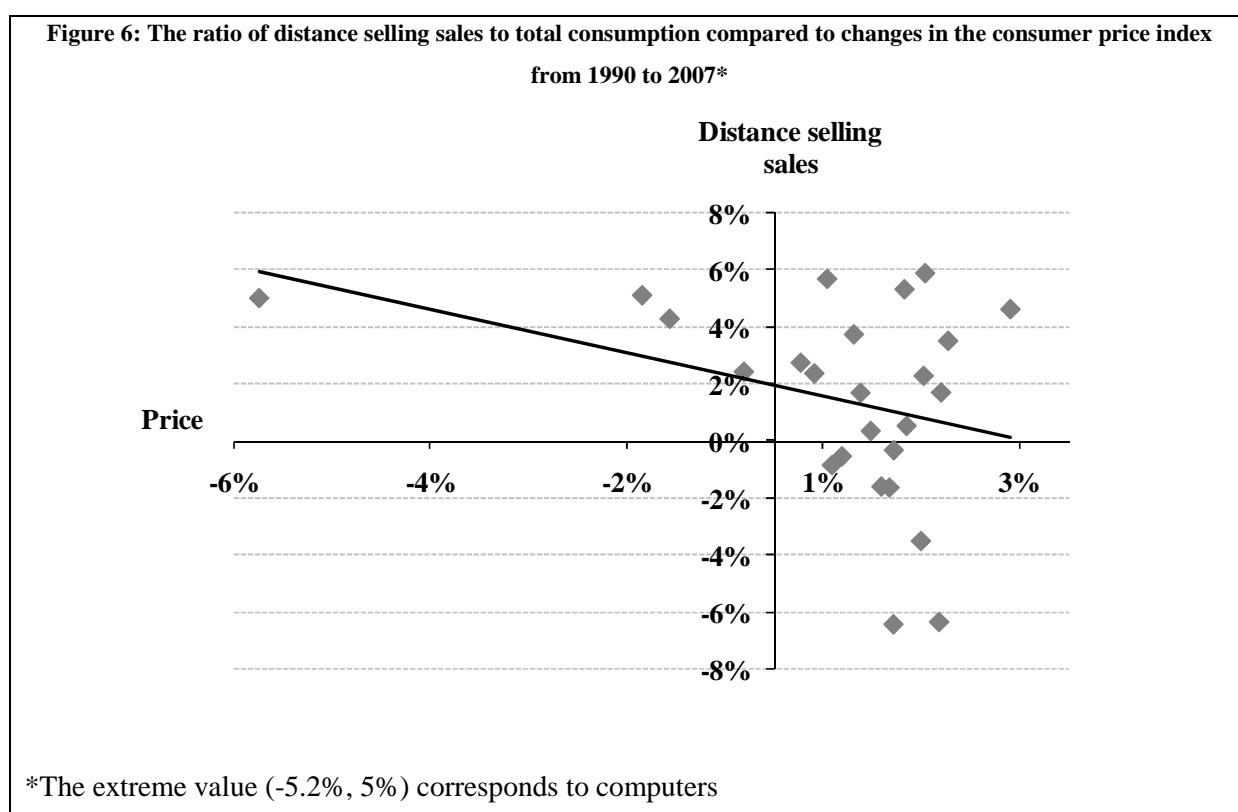

Figure 5: Average annual inflation rate for product categories and the aggregate HICP from 1990 to 2007
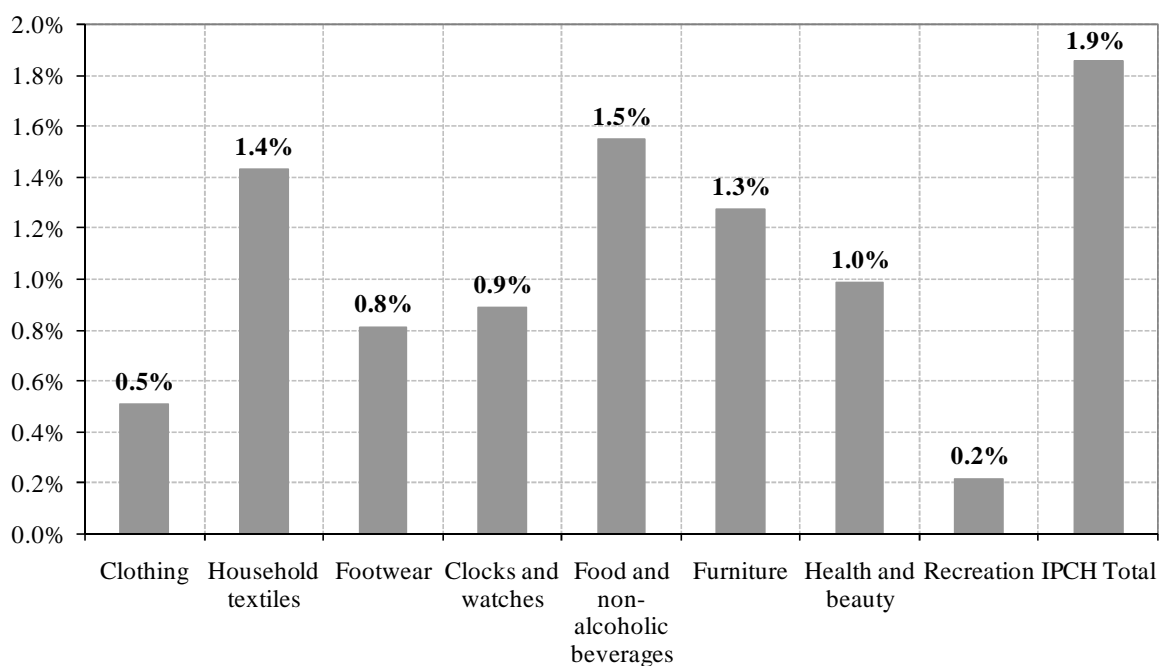
Explanatory variables

We use ratio of distance selling sales to total consumption (CA_VAD/Conso) as the key indicator for each family of products in order to adjust the growth of distance selling sales for inflation and the increase in overall consumption. Total consumption of a family of products is equal to households' final consumption expenditure at current prices taken from the annual national accounts, which we then multiply by the weighting of the product category in the national ICP. This gives us a proxy for consumption by product category at current prices.

Figure 6 shows the average annual inflation for the families of products in our panel as a function of the increase in distance selling sales from 1990 to 2007.

Figure 6: The ratio of distance selling sales to total consumption compared to changes in the consumer price index from 1990 to 2007*

*The extreme value (-5.2%, 5%) corresponds to computers

This chart suggests a correlation between the growth of online shopping and prices.

3. Econometric strategy and results

The econometric strategy attempts to verify whether the growth of distance selling actually has an impact on inflation. The endogenous variable is the annual change in the price indices for families of products and the two explanatory variables are the level and the variation of the *CA_VAD/Conso* variable. These effects – level and variation – may account for the different theories developed in introduction, without rejecting one or the other. For example, the level variable may capture the impact of the entrance of distance sellers with a technology with a more rapid TFP growth. This hypothesis asserts that, at constant market shares, the greater reduction of online distributors' costs made possible by their use of new information and communication technologies causes a deflationary dynamic. This dynamic was accentuated during the period under consideration (1990 to 2006), which corresponded to a time of transition and development for the Internet. The best sellers were selected and price comparisons were facilitated, which helped to temper price increases. This was also a period when the Internet underwent technological and organisational changes that produced increasing returns to scale. The range of products and customers involved in online shopping also expanded. Under this hypothesis, there is an empirical negative correlation between the market share of distance selling and inflation. On the contrary, the level variable can also capture the reputational effect of distance sellers. The variation variable can measure the deflationist effect of an increase in competition due to new entrants, or the inflationist effect of the "Long Tail".

In this period, where the market is still far from mature, the level of distance selling and the variation of distance selling should both have an impact on inflation. Four basic models were estimated. The first considers only the level effect of distance selling on inflation, while the second model considers only the variation effect and the third model considers the impact of both the level effect and the variation effect on inflation.

Model 1: Level effect

$$\Delta \ln\left(IPC_{j,t}\right) = \alpha \ln\left(CA\_VAD_{j,t-1}/conso_{j,t-1}\right)$$
$$+ X + \varepsilon$$

Model 2: Combined

$$\Delta \ln\left(IPC_{j,t}\right) = \alpha \ln\left(CA\_VAD_{j,t-1}/conso_{j,t-1}\right)$$
$$+ \beta \Delta \ln\left(CA\_VAD_{j,t-2}/conso_{j,t-2}\right)$$
$$+ X + \varepsilon$$

Model 4: Level effect before and after Internet

$$\Delta \ln\left(IPC_{j,t}\right) = \alpha_1 \ln\left(CA\_VAD_{j,t-1}/conso_{j,t-1}\right)$$
$$+ \alpha_2 D_{\mathrm{int}} \ln\left(CA\_VAD_{j,t-1}/conso_{j,t-1}\right) + X + \varepsilon$$

Model 5: Combined effect before and after Internet

$$\Delta \ln\left(IPC_{j,t}\right) = \alpha_1 \ln\left(CA\_VAD_{j,t-2}/conso_{j,t-2}\right)$$
$$+ \alpha_2 D_{\mathrm{int}} \ln\left(CA\_VAD_{j,t-2}/conso_{j,t-2}\right)$$
$$+ \beta_1 \Delta \ln\left(CA\_VAD_{j,t-1}/conso_{j,t-1}\right)$$
$$+ \beta_2 D_{\mathrm{int}} \Delta \ln\left(CA\_VAD_{j,t-1}/conso_{j,t-1}\right) + X + \varepsilon$$

j denotes the product index and D_{int} is a dummy variable equal to the share of internet surfers in % in the whole population every year. Figure 7 displays the evolution of the variable. If online shopping has a deflationary impact that is greater than that of other forms of distance selling, the coefficients α_2 and β_2 should have a negative sign.

Figure 7 : Evolution of the share of internet surfers in the whole population in % from 1990 to 2007
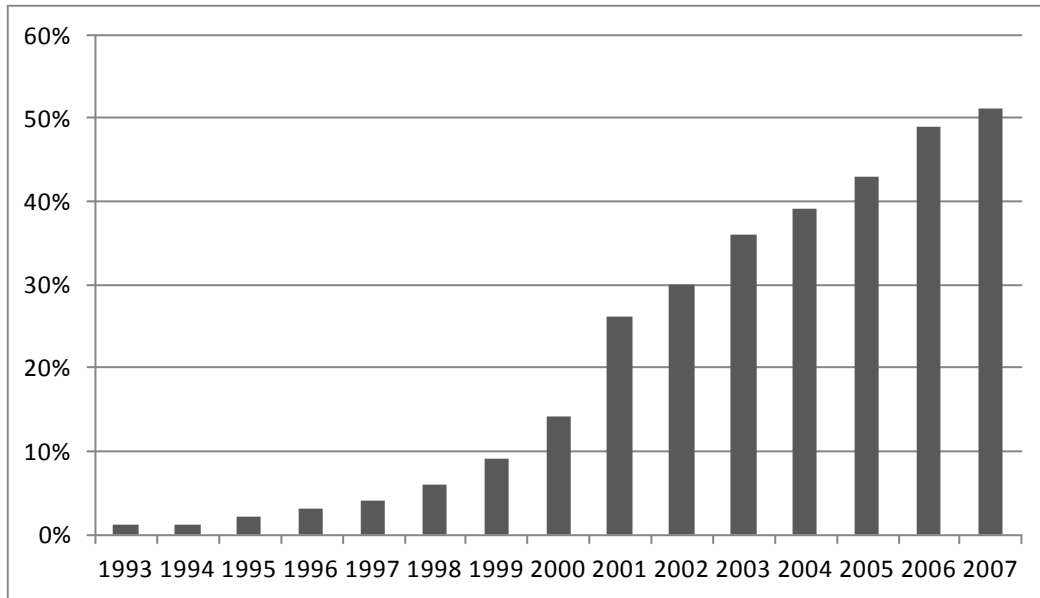
The explanatory variables are lagged for three reasons. First of all, there is a "calendar effect". The bulk of online sales come at the end of the year and the various market players respond to their impact in the following year. Secondly, there is a possible simultaneity bias, when a technological shock

reduces the prices of a sub-category of products usually sold online (e.g. flat screens) leading to a deflationary effect and an increase in online sales. Finally, the causal link between prices and distance selling may be the other way round: it may be sharply lower prices, for electronic goods, for example, that make consumers less hesitant to shop online, rather than the growth of the Internet that reduces prices by introducing more competition.

In order to eliminate any supply shocks or demand shocks relating to overall changes in production costs, for example, we included a fixed "year" effect. This means there is a dummy variable for each year in our models. Similarly, we added fixed effects for each type of product to absorb product-specific trends.

Dealing with heteroskedasticity

We are working with product categories with different levels of aggregation, which means that the statistical construction of price indices could give rise to a degree of heteroskedasticity in the model.

In a first set of regressions, the heteroskedasticity is dealt with automatically by calculating robust standard errors using the Hubert-White method.

A second method for adjusting for this source of heteroskedasticity is to use least squares weighted by the weight of the family of products in the aggregate national consumer price index. If we assume that the differences in the accuracy of the price estimates for each variety[5] are second order differences, the inaccuracy of the price index for a family of products would be inversely proportional to the number of varieties in the family, in accordance with the law of large numbers. Unfortunately, INSEE does not reveal how many varieties are in each family of products. If we assume that the share of consumption of a family of products is a function of the number of varieties in that family, we can derive the following parameterisation:

$$\sigma_j^2 = \sigma^2 \big/ f(conso_j)$$

This parameterisation is a second way of attenuating the heteroskedasticity of the panel, using weighted least squares. However, a Breusch-Pagan test suggests the presence of residual heteroskedasticity in the model, even after correcting for the statistical construction bias of the price index, which seems to make the generic Hubert-White method the better choice.

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[5] The accuracy of a variety price depends on a large number of factors, including, or course, the number of areas covered by the survey and the number of price collections carried out in each area, as well as the homogeneousness of the variety in question (see box on page 122 of INSEE Méthodes 81-82 from 1998, which provides details about shampoo and bread prices).

Distance selling does seem to be linked to a reduction of inflation

Table 3 shows the estimation of five models with robust standard errors and fixed effects (columns 1 to 4) and five models with weightings (columns 5 to 8). Column 1 shows that a regression based on Model 1 reveals that the share of distance selling in total consumption has a significant negative effect on inflation. Column 2 shows that both the share of distance selling and the increase in the share of distance selling have deflationary effects, but that the significance of the first difference term is weak. Column 3 and 4 of Table 3 confirms that the distance selling effect seems to be stronger after the emergence of the Internet than before. The full Model 4 confirms a statistically significant effect of both the share and the increase of distance selling, which becomes stronger after the emergence of the Internet. The second part of Table 3, with the models with weightings, bears out these findings and gives more accurate estimates of the coefficients.

Variants: Introduction of producer prices, exclusion of the largest categories and percentage model

We introduced the "producer prices" variable to complete our model. Our research looks at the impact of the Internet on consumer price levels after stripping out the effect on producer prices. We use the producer prices provided by INSEE. As described in the methodological note to the INSEE producer price and import price indices in industry, "the producer price indices in industry for the French market measure changes in transaction prices, excluding VAT, for goods produced by industrial activity and sold on the French market. The indices are calculated on the basis of monthly price observations (or quarterly observations in certain branches of industry) and for some 26,000 products collected from a representative sample of 3,900 enterprises as part of a mandatory survey called *Observation of Prices in Industry and Business Services*." The producer price data are supplemented with import prices, when INSEE data series are available. Import prices are actually more relevant than producer prices for some product categories. This is the case for toys and computer equipment, which are mostly imported from Asia in most instances. Therefore, INSEE has compiled special import price series, which we have introduced into the model to take the place of producer prices. These import prices are the transaction prices for goods produced by industrial activity and imported to France. The prices tracked are the CIF (Cost Insurance Freight) prices at the border, excluding duties and import taxes, expressed in euro.

Table 4 adjusts the estimates in Table 3 for producer/import prices. The number of observations is reduced from 455 to 105 because we do not have producer prices for every product category over the whole period. According to the student-statistics, coefficients are still significant. The level of coefficient is decreased by the reducing of the estimation period and by the restriction of the sample, but not by the introduction of the control variable.

Table 5 presents alternative estimates aimed at assessing the robustness of this set of results. To ensure that the largest categories are not the source of the observed causal relationship, we have tested the same equations after eliminating food products, computers and both.

After eliminating food products, the estimates are less accurate, but the estimated coefficients are still of the same order of magnitude. When we eliminate computers, the coefficients are 30% lower.

Conclusion

The Internet has clearly stimulated distance selling in recent years. The development of distance selling has multiple micro effects. Thus, it may mean stiffer competition for brick-and-mortar distributors and result in lower prices for the relevant goods. But the "Long Tail" effect, with the development of niche products, may lead to an increase in prices. A reputational effect may also reduce competition. For some goods, distance selling may provide access to lower prices for certain consumer segments, without affecting the mark-ups of conventional distributors. This will also lead to lower prices at the aggregated level. We have tested two non-exclusive hypotheses about the transmission of distance selling to prices: in level and in variation. Only the hypothesis in level seems to be robust.

Under these circumstances, the growth of distance selling, and particularly online selling, seems to be a non-negligible factor in the price variations for certain goods. Even though the exercise does not consider the very heterogeneous nature of the goods, these findings suggest that, if the growth of online shopping caused the distance selling market share in France to double to reach the level of the British distance selling market share, this could lead to a lasting fall in the French inflation rate of about half a percentage point. Such growth is realistic: if the current trend[6] continues, the share of online shopping could even reach the American level in less than a decade. The share in France was 1.2%, versus 3.4% in the United States in 2005. An analysis of microeconomic data would determine whether this substantial attenuation of inflation stems from enterprises' efforts to trim margins in the face of stiffer competition, caused by the entry of new players with strong TFP growth, or from a reduction in transaction costs made possible by online selling.

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[6] Despite the recession in the first quarter of 2009, online retail selling (except for travel and recreation) grew by 10%.

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Appendix

Figure 1: The 9 product categories tracked in the FEVAD data as a share of households' consumption in 2006

Clothing

Household textiles

Footwear, leather goods

Clocks, watches, jewellery

Food and non-alcoholic beverages

Furniture, household equipment and routine household maintenance

Beauty, personal care, health products

Recreation and culture (including computers)

Baby supplies

Not covered by FEVAD data
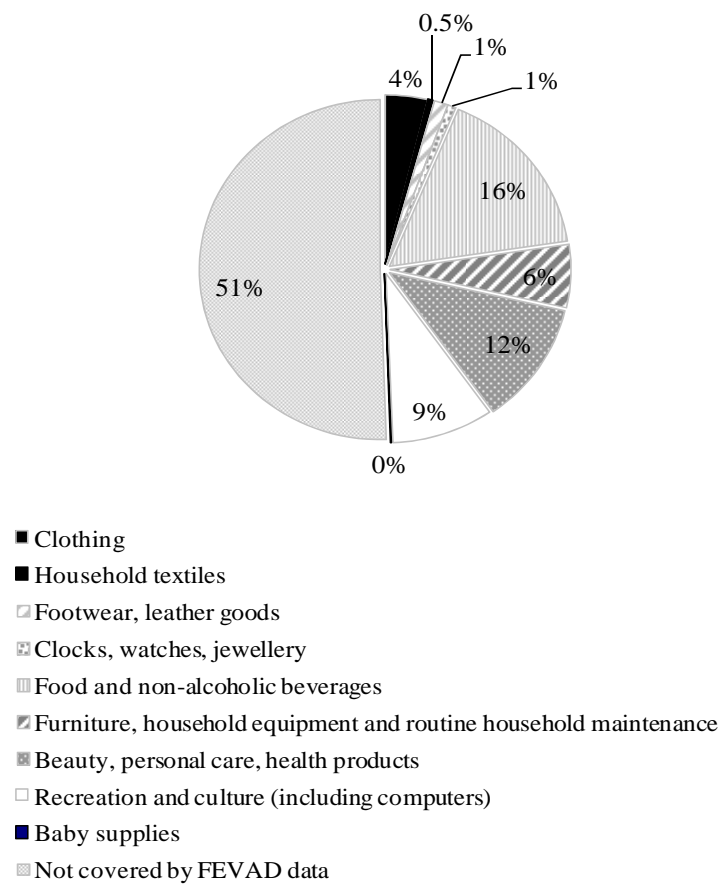
		Poids dans le panier de consommation des ménages (total = 10 000)	Part de marché de la VAD, en %		
		2006	1990	2000	2006
1	Vetements	380	6,3	9,7	8,8
11	Vetements de dessus	145	5,0	10,0	9,4
111	Vetements de dessus pour hommes	51	1,8	3,8	4,6
112	Vetements de dessus pour femmes	94	7,8	14,1	12,0
12	Vetements de dessous	136	7,9	10,5	9,6
121	Vetements de dessous pour hommes	50	5,9	5,8	5,4
122	Vetements de dessous pour femmes	86	9,3	13,5	12,1
13	Vetements de sport	35	20,8	10,2	6,7
14	Vetements enfants	64	4,7	6,8	6,9
2	Articles de menage en textile	45	15,9	17,0	20,8
21	Linge de maison et couverture	17	18,9	31,0	44,0
22	Tissus d'ameublement, voilages	11	13,5	14,3	12,7
23	Laines et mercerie	2	11,2	14,3	23,4
3	Chaussures Maroquinerie	125	1,9	2,1	3,4
4	Horlogerie Bijouterie	73	1,9	1,8	4,2
5	Produits alimentaires et boissons non alcoolisees	1638	0,1	0,1	0,4
6	Ameublement, equipement menager et entretien courant de la maison	599	2,3	2,2	2,6
61	Meubles et articles d'ameublement	150	1,0	0,6	0,6
62	Petit et gros électroménager	92	2,4	3,8	5,3
63	Mobilier dechambre	38	13,9	15,8	24,3
64	Articles de decoration	9	8,4	6,4	6,5
7	Toilette beauté hygiène santé	1165	0,6	0,7	0,7
8	Loisirs et culture	913	3,1	2,8	4,0
811	Articles de quincaillerie, fournitures de bricolage	4	4,0	4,8	14,6
812	Jeux et jouets	44	3,4	4,4	5,1
813	Livres	42	15,4	19,1	23,9
814	Articles de papeterie	14	3,1	1,1	0,0
815	Journaux et periodiques	82	1,4	1,6	1,9
816	Equipements audio visuels, photographiques et informatiques	203	2,9	3,1	6,5
817	Supports d enregistrement de l image et du son	53	4,2	4,9	8,4
818	Outillage et autres materiels pour la maison et le jardin	47	1,4	1,5	0,5
820	Meubles de jardin	4	6,7	4,1	5,8
821	Horticulture	64	1,5	3,1	2,2
822	Matériel de sport Accessoires auto moto	79	1,5	0,8	1,2
9	Articles de puericulture	7	6,2	5,1	6,7

Table 2: Variable statistics

Variables	No. obs.	Mean	Median	Std. err.	5%	25%	50%	75%	95%
Distance selling share of consumption (%)	472	7.8	4.6	0.084	0.6	2	4.6	11.1	25.3
Inflation (%)	472	0.74	0.7	0.02	-0.09	0.04	0.7	1.64	3.86
Change in the distance selling share of total consumption (log values)	472	0.01	0.01	0.24	-0.35	-0.21	0.01	0.09	0.35

Table 3: Regressions on all products: 28 product categories, data from 1990 to 2007. Dependent variable: annual log change in prices from 1991 to 2007

Regressors	Models with robust standard errors					Models with weightings		
	Model 1a	Model 2a	Model 3a	Model 4a	Model 1b	Model 2b	Model 3b	Model 4b
Distance selling share of total consumption, 1 lag	-0.0067*** (-2.8)	-	-	-	-0.0054** (-2.20)	-	-	-
Distance selling share of total consumption, 2 lags	-	-0.0088*** (-2.92)	-	-	-	-0.0065** (-2.23)	-	-
Change in the distance selling share of total consumption, 1 lag	-	-0.0031 (-1.12)	-	-	-	-0.0035 (-0.97)	-	-
Distance selling share of total consumption, 1 lag	-	-	-0.0058** (-2.26)	-	-	-	-0.008*** (-3.31)	-
Distance selling share of total consumption, 1 lag*share of net surfers, 1 lag	-	-	-0.0058** (-2.52)		-	-	-0.018*** (-8.58)	-
Distance selling share of total consumption, 2 lags	-	-	-	-0.0078** (-2.45)	-	-	-	-0.010*** (-3.67)
Distance selling share of total consumption, 2 lags*share of net surfers, 1 lag				-0.0046* (-1.72)	-	-	-	-0.018*** (-7.31)
Change in the distance selling share of total consumption, 1 lag				-0.019 (-1.32)	-	-	-	-0.016** (-2.28)
Change in the distance selling share of total consumption *share of net surfers, 1 lag	-	-	-	0.0010 (0.025)	-	-	-	0.018 (0.86)
Number of observations	446	446	446	446	472	446	444	446
Fixed effects								
Fixed product effect	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Fixed year effect	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
R²	70%	65.6%	68.5%	66%	72%	68%	73%	78%
Number of products	28	28	28	28	28	28	28	28

Table 4: Regressions on all products where producer and import prices are available: 18 product categories – Dependent variable: annual log change in prices from 2002 to 2007

Model 1. Control with change in producer prices

Model 2: Without the control, to test for the impact of the restriction of the sample

	1. Robust– Adjusted for producer prices		2. Robust	
Régressors	Modèle 1	Modèle 2	Modèle 1	Modèle 2
Change in producer prices (log values)	0.26** *(4.27)*	0.25*** *(4.1)*	-	-
Distance selling share of total consumption , 1 lag	-0.011** *(-3.41)*	-	-0.006* *(-1.7)*	-
Distance selling share of total consumption, 2 lags	-	-0.014*** *(-4.02)*	-	-0.01*** *(-2.7)*
Change in the distance selling share of total consumption, 1 lag	-	-0.005 *(-1.09)*	-	0.002** *(0.35)*
Number of observations	105	105	105	105
Fixed effects				
Fixed product effect	Yes	Yes	Yes	Yes
Fixed year effect	Yes	Yes	Yes	Yes
R^2	96%	96%	95%	95%
Number of products	18	18	18	18

Table 5: 1. Regressions on all products, except food and computers: 26 product categories, data from 1990 to 2007. Dependent variable: annual log change in prices

 2. Regressions on all products, except food and computers, where producer and import prices are available: 13 product categories, data from 2002 to 2007. Dependent variable: annual log change in prices

Régresseurs	1. Models with robust standard errors			2. Models with robust standard errors – Adjusted for producer prices	
	Modèle 1	*Modèle 2*	*Modèle 3*	Modèle 1	Modèle 2
Change in producer prices (log values)	-	-	-	0.16* *(1.7)*	0.17* *(1.89)*
Distance selling share of total consumption, 1 lag	*-0.0047*** *(-2.21)*		-	-0.020** *(-2.15)*	-
Distance selling share of total consumption, 2 lags	-	*-0.0060* *(-2.34)*	-	-	-0.028** *(-2.14)*
Change in the distance selling share of total consumption , 1 lag	-	*-0.0014* *(-0.54)*	-	-	-0.012 *(-1.6)*
Distance selling share of total consumption, 1 lag	-	-	*-0.0036* *(-1.51)*	-	-
Distance selling share of total consumption, 1 lags* net surfers share, 1 lag	-	-	*-0.0046** *(-1.70)*	-	-
Number of observations	440	414	440	78	78
Fixed effects					
Fixed product effect	Oui	Oui	Oui	Oui	Oui
Fixed year effect	Oui	Oui	Oui	Oui	Oui
R²	62%	56%	62%	66%	69%
Number of products	26	26	26	13	13