What to Expect of the Euro?
Analysing Price Differences of Individual Products in Luxembourg and its Surrounding Regions*

By

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ABSTRACT:

This paper uses individual supermarket prices and analyses to what extent absolute deviations from the law of one price are attributable to transaction costs. The results indicate that absolute percentage price differences are increasing in distance, but at a decreasing rate. Similarly, crossing borders increases price deviations, while being inside the former Belgian-Luxembourg monetary association has the opposite effect. This result nurtures the hopes that the euro may be able to reduce regional and cross-border price differences in the long term. Furthermore, larger differences in packaging sizes result in larger price deviations, while the opposite is the case for prices observed within the same retail group.

Keywords: Euro, Price Dispersion, Price Convergence, Law of One Price

JEL Classification: E31, F36, R11

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RESUME NON-TECHNIQUE

Les travaux et les résultats présentés dans le cadre de cette publication s'insèrent dans l'étude de l'économie de la Grande Région.

Depuis le milieu des années 1980, la Communauté européenne a entrepris des efforts considérables pour surmonter la paralysie de l'intégration économique et pour achever le marché unique européen prévu de longue date. Les différences de prix concernant des produits quasiment identiques ont diminué ces derniers temps. Néanmoins, des différences de prix importantes existent encore, en particulier au niveau des produits individuels. Récemment, une inquiétude est apparue concernant le processus continu de convergence des prix.

L'euro est généralement considéré comme constituant une étape cruciale en faveur du processus d'intégration européenne et de l'intensification de la concurrence au sein du marché unique européen, puisqu'il augmente la transparence des prix. Par conséquent, il améliore la possibilité des producteurs et des consommateurs de comparer les prix d'un pays à l'autre. Ainsi, il leur permet de saisir des opportunités d'arbitrage existantes. En théorie, cela devrait renforcer la concurrence internationale, ce qui devrait alors faciliter la stabilisation des prix à la consommation. Cependant, il reste à voir si la transparence des prix et les réductions des coûts de transactions qui en résulte sont suffisamment importantes pour réduire la tranche d'inaction dans laquelle les prix peuvent fluctuer sans déclencher des arbitrages de la part des consommateurs et si le différentiel international des prix a tendance à diminuer.

L'analyse empirique présentée ici utilise les prix individuels à la consommation du Luxembourg et des régions avoisinantes de Lorraine, de Rhénanie-Palatinat et de Wallonie, collectés à plusieurs reprises entre octobre 2001 et avril 2002, et étudie la contribution des facteurs de coûts de transactions aux différences de prix régionales. Un objectif de l'analyse est de savoir si les différences de prix sont inférieures dans l'ancienne association monétaire belgo-luxembourgeoise. De plus, si nous croyons effectivement que l'euro aidera à réduire les différences de prix régionales et internationales à long terme, les constatations relatives à l'ancienne association

monétaire belgo-luxembourgeoise peuvent donner des indications quant à ce que nous pouvons nous attendre à long terme.

Le Luxembourg et ses régions limitrophes apparaissent comme un candidat naturel pour une telle étude. Quatre pays ont des frontières communes dans un espace peu étendu. Par ailleurs, ces régions sont hautement intégrées. Ce degré élevé d'intégration régionale signifie également qu'une grande partie de la population était habituée à comparer et à acheter dans des monnaies différentes avant l'introduction de l'euro. Autrement dit, il sera extrêmement intéressant de voir si les facteurs de coûts de transactions contribuent aux différences de prix régionales dans ces régions hautement intégrées.

Les résultats empiriques contenus dans ce papier soutiennent généralement l'argument des coûts de transactions. Plus spécifiquement, les différences de prix absolues augmentent avec la distance, mais avec un taux décroissant. De même, passer les frontières augmente les différences de prix, alors qu'en restant à l'intérieur de l'ancienne association monétaire belgo-luxembourgeoise les différences de prix diminuent. Cela suggère qu'une monnaie unique produit les effets souhaités. Ces résultats sont plutôt remarquables quand on considère l'espace géographique très restreint qui a été analysé et le degré élevé d'intégration de ces régions voisines. Par ailleurs, il est d'un intérêt particulier de constater qu'autres études ont également démontré que les différences de prix entre la Belgique et le Luxembourg sont inférieures que celles observées entre d'autres paires de pays, pas seulement parce que ces deux pays sont proches l'un de l'autre, mais aussi parce qu'ils ont partagé une monnaie commune avant l'adoption de l'euro. Ceci renforce les attentes que l'euro réduira à long terme le différentiel de prix au niveau régional et international. En ce sens, les résultats pour la Grande Région présentés ici constituent une étape intermédiaire qu'il conviendra de compléter sur base de donnés additionnelles.

1 Introduction

The euro is generally seen as a crucial step towards further European integration and increased competition within the Single European Market. The euro increases price transparency and hence improves the possibilities of both producers and consumers to compare prices across regions and borders, thereby allowing them to seize existing arbitrage possibilities. In theory, this fact should help to foster increased cross-border competition, which in turn should facilitate the stabilisation of consumer prices and the reduction in regional price differences within the European Monetary Union.[1] The aim of this paper is to analyse to what extent the euro may be expected to contribute to reductions in regional price dispersion, a topic being directly related to the euro cash changeover on 1 January 2002.

It is obviously too early to evaluate the price and convergence effects, not to mention the economic benefits, brought about by the introduction of the euro. The cash changeover transition period has barely ended yet and many economic effects will materialise only in the long term. A good starting point is firstly to review the European integration process with respect to price convergence. This may give us a flavour of what to expect of the single currency. Secondly, we will use individual product prices from Luxembourg and the surrounding regions Lorraine, Rhine-Palatinate and Wallonia, collected on several occasions between October 2001 and April 2002, in order to analyse the extent to which transaction cost factors contribute to deviations from the law of one price (LOP). One particular question of interest is whether price differences are lower within the former Belgian-Luxembourg monetary association.

Luxembourg and its surrounding regions emerge as a natural candidate for such a study. With relatively short distances between them, four countries border each other. Furthermore, these regions are highly integrated. This reduces the obstacles, which somewhere else may effectively seal off regions from each other. The high degree of regional integration also means that a high share of the population was used to comparing and paying prices in different currencies prior to the introduction of the

[1] See for example ECB (2002).

euro. Expressed differently, it will be highly interesting to see whether transaction cost factors contribute to regional price differences across these highly integrated regions. Moreover, if we indeed believe that the euro will help to reduce cross-border price differences in the long term, evidence from the former Belgium-Luxembourg monetary association may give an indication of what to expect or not to expect in the long term.

The remainder of this paper is organised as follows: Section 2 reviews the effects of the European integration process on price dispersion. Section 3 analyses the factors contributing to regional price dispersion, using individual retail data from Luxembourg and its surrounding regions. Section 4 concludes.

2 The European Issue

European Integration and Price Convergence

A commonly used and operational definition of market integration is based on the '*law of one price*', which states that prices of identical products should not differ (geographically) in perfectly integrated markets.[2] In other words, product prices should be identical in different countries when expressed in a common currency, whereby price equality is ensured as a result of frictionless consumer arbitrage. In reality though, transaction costs, such as trade barriers, borders, market imperfections, but also exchange rate uncertainties, can result in market segmentation and arbitrage not being exerted. Expressed differently, the presence of transaction costs and trade barriers may induce a '*band of inaction*', within which prices of (quasi)-identical goods can fluctuate without arbitrage taking place. As a result, price convergence is not necessarily a linear function of price differences.[3]

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[2] A review of the literature on the '*law of one price*' or the '*purchasing power parity*' is beyond the scope of this paper. Dornbusch (1987) provides an early review of the literature, while Froot & Rogoff (1995), Rogoff (1996), Goldberg & Knetter (1997) or Sarno & Taylor (2002) provide excellent and somewhat more recent accounts of current developments and contributions to this literature.

[3] There is ample empirical support for this idea, as price convergence typically emerges more rapidly if initial price deviations are high than if they are low (e.g. Parsley & Wei, 1996; Cecchetti, 1999; Haskel & Wolf, 2001; Asplund & Friberg, 2001).

The Single Market Programme aimed to overcome the remaining artificial impediments to integration, which consisted of physical, administrative and technical barriers, such as border controls, non-harmonised legislation and technical regulations. These remaining barriers contributed to markets remaining nationally segmented and effectively impeded further market integration. And indeed, the Single Market Programme evaluation report shows that these efforts have not gone unnoticed. Industries were induced to restructure, leading to increased pressures on price-cost margins, but also to price convergence across the EU. Most price convergence was for highly traded goods, as that is where we would expect price convergence to emerge in the first place (European Commission, 1996). Price dispersion, based on PPP data on final consumption expenditures, has fallen from above 20 percent in the beginning of the 1990s to around 15 percent at the end of the 1990s (European Commission, 2001a, 2002).

The European Commission has recently conducted several studies concerning price dispersion of individual products.[4] In general, prices of food products, such as oils and fats, meat, bread and cereal tended to converge during the 1990s, while other products, such as tobacco, fuel, transport services and construction showed little price convergence and sometimes even increasing price divergence. In addition, large price differences persist, in particular at the individual product level. For most supermarket products, the differences between the cheapest and dearest products exceed 50 percent. As an example, for *Mars* bars, the price difference between the cheapest country, Belgium, and the dearest country, Denmark, is almost 100 percent. With few exceptions, the price variance is lower for homogenous products, as one might expect (European Commission, 2002).

Cross-country differences in VAT rates constitute another potential source for price dispersion. Rogers argues (2002) that the decline in European price dispersion in the 1990s coincided with the increased harmonisation of member states' VAT rates. His

[4] An account of price levels and price dispersion in the EU is provided in European Commission (2001a). More detailed studies are available for electronic goods, fresh food products (European Commission, 2001b) and supermarket products (European Commission, 2001c, 2002). Data on consumer electronics, fresh food and supermarket prices were collected over a one-year period between 1999 and 2000.

results show a correlation coefficient of over 90 percent between the standard deviation of a traded goods price index and that of VAT rates across EMU-11 countries. According to the European Commission (2002), however, price dispersion is not affected by much when comparing prices inclusive or exclusive of VAT. Similarly, Parsley & Wei (1996) report that, for the U.S., sales taxes have a minimal influence on the time series properties of deviations from the law of one price.

The European Commission (2002) explains the remaining price differences in the EU with natural factors, structural factors and market conditions. Firstly, natural factors comprise local preferences, consumer search costs and transport costs. It is suggested that observed price differences are also related to the size of the local market. There seems to be an inverse relationship between the market size for a product and the price of the product.

Another source of price variation in supermarket prices relates to different packaging sizes and to different retail structures across the EU, the former of which relates to differences in consumer preferences and tastes and the latter to the structural differences. The European Commission reports that prices are generally cheaper in hypermarkets than in ordinary supermarkets. Hypermarkets cater predominately for families. In other words, packaging sizes are generally larger and unit prices lower. Consequently, countries with a high share of supermarkets tend to have higher prices (European Commission, 2001c).

How Far are we Away from the U.S.? Has EU Price Convergence Halted?

Rogers (2001) provides a comparison of price dispersion similarities and differences between the euro area and the U.S. This is shown in Table 1. It is apparent that price dispersion of tradable products in the euro area has continuously fallen between 1990 and 1999, while it remained more or less unaltered in the U.S.[5] With regard to non-tradables, price convergence is recorded neither in the euro area nor in the U.S. The large difference in price dispersion in non-tradables between the U.S and the euro area is explained by the large price dispersion in housing prices between U.S. cities.

[5] He uses individual product price data from the *Economist Intelligence Unit*, consisting of 168 annual, individual product prices in 26 cities in 18 countries.

Table 1: Standard Deviation of Product Prices in the Euro Area and the U.S.

Country	Price index	1990	1995	1999
Euro Area	Overall	0.12	0.12	0.11
	Tradables	0.12	0.08	0.06
	Non-Tradables	0.27	0.33	0.31
United States	Overall	0.16	0.15	0.17
	Tradables	0.05	0.04	0.04
	Non-Tradables	0.51	0.52	0.57

Note: Products are weighted according to country-specific HICP weights.
Source: Rogers (2001).

Despite the recent reduction in price dispersion in the EU, there is concern about the future progress. On the one hand, the European Commission pointed out in several documents that the convergence process is slowing down (e.g. European Commission, 2001b,c, 2002). Similarly, the results by Goldberg & Verboven (2001a) for the European car market indicate that European integration has led to a gradual reduction in car price differentials between 1970 and 2000, but the European integration process had little impact on the speed of convergence. They argue that, if anything, the speed of convergence seems to have decreased.

On the other hand, Rogers (2001) pointed out that, given that the U.S. constitutes the relevant benchmark, further scope for price level convergence in the euro area may be limited, as price dispersion in the EU already seems close to that of the U.S. Furthermore, the seeming slowdown in price convergence is, at least in principle, coherent with both European integration achieving what it set out to achieve and the non-linearity of the price convergence. This may indicate the presence of a band of inaction, within which arbitrage is effectively prevented from taking place.

This point, however, neglects that deviations from LOP are typically found to increase in distance (e.g. Engel & Rogers, 1996; Parsely & Wei, 1996, 2001, Cecchetti et *al.*, 1999, Haskel & Wolf, 2001). This may be of particular importance when considering that the average distance between the EU or EMU city-pairs is considerably lower than the average distance between U.S. city-pairs. For that reason, Rogers (2002) argues that there is further potential for price convergence in the EU. But then again, Parsley & Wei (1996) conclude that differences in distance are only, to a minor extent,

responsible for differences in obtained convergence speeds when comparing their estimates for U.S. cities with the previously obtained results in Wei & Parsley (1995) for tradables sector indices of OECD cities. Hence, there is not much consensus on what to expect.

The Euro and Price Convergence?

The euro is undoubtedly a crucial step towards further European integration. The euro eliminates the exchange rate volatilities within the euro area, which is expected to lead to a reduction in the associated price variability. This indeed seems to be the case, as shown in a recent study by Parsley & Wei (2001). Moreover, they show that a hard peg reduces the price variability to a larger extent than a mere exchange rate variability reduction. The estimate for the euro indicates that the price variability is reduced by a magnitude similar to that of the hard peg. The strongest effect is, however, estimated for the U.S., which is ascribed to its higher economic and political integration. Being in the U.S. reduces the price variability by three times more than simply participating in a hard peg. This is interpreted as scope for further integration of goods markets in the European Union and the euro area.

The effect of the euro is estimated to be equivalent to a reduction in tariff rates in each country of about four percent. Parsley & Wei argue that this is more or less equivalent to the price variability reduction achieved by Single Market Programme in the 1990s. However, once the degree of goods market integration is incorporated in the regressions by including a dummy variable for membership in a trading block, such as the EU, EFTA and others, the estimated coefficient of the euro on price variability becomes insignificant.[6] This leads Parsley & Wei to conclude that the euro has not generated any significant integration effects so far.

Lutz (2002) arrives at a similar conclusion. He provides first estimates using four different data sets covering products, such as *Big Macs*, the *Economist Magazine*, cars and price index series on various products and services and finds only weak overall support for the suggestion that the euro lowers price dispersion. Goldberg & Verboven

[6] The idea is that membership in an institutionalised free trade area reduces price variability more than simply reducing trade barriers unilaterally.

(2001a) are also sceptical about the euro effect. They argue that the euro will not eliminate cross-country car price differences unless further measures are taken to harmonise and integrate.

Hence, it seems that the euro has so far not generated many noteworthy integration effects that transcend the mere elimination of the exchange rate volatility. However, the elimination of exchange rate volatilities is only one aspect of the single currency. At the moment, many expectations rest on the introduction of euro cash, i.e. the euro banknotes and coins, at the beginning of the year 2002. It is hoped that the price transparency and the associated increase in arbitrage possibilities will strengthen cross-border competition and induce further reductions in the price dispersion within the euro area (e.g. ECB, 2002; European Commission, 2003).

A related point is that, due to the introduction of euro banknotes and coins, pricing points have theoretically become identical across euro area member states. To what extent different national psychological and fractional pricing points contributed to deviations from the law of one price and its persistence seems, a priori, to be an interesting and relevant, but yet unexplored, explanation of why the law of one price fails to hold. Who knows whether the euro cash changeover and the implied price transparency and improved arbitrage possibilities may not after all prove to be the decisive step in this integration process? Friberg (2003), however, remains sceptical about the importance of increased price transparency. He argues that, yes, the euro will further European integration, but, no, price transparency and price arbitrage will not be decisive in this matter.

The Belgian-Luxembourg monetary association – A yardstick for the euro area?

In this context, it is often neglected that Belgium and Luxembourg were part of a monetary association and *de facto* shared one single currency prior to the adoption of the euro in 1999.[7] Evidence of this special case may help to give some further insights.

[7] With exception of the period between 1935 and 1944, the Belgian and Luxembourg Francs have circulated in practice with an exchange rate of 1:1 since 1921. In 1929, the Luxembourg Franc was explicitly linked at 1:1 to the Belgian Franc, i.e. both currencies were fixed in the same manor with regard to gold standard. The Belgian-Luxembourg monetary association (which is the technically correct term) ceased to exist with the introduction of the European Monetary Union on 1 January 1999, when the exchange rates were irrevocably fixed at 40.3399 LUF or BEF to the euro.

Parsley & Wei (2001) report that sharing a common language reduces the price variability by about 2 percent, while sharing a long history of a hard peg or common currency, as was the case for Belgium and Luxembourg, reduces the price variability by almost 8 percent. This is twice the magnitude of the estimated euro effect.

Similarly, Crucini et *al.* (2001) consider the Belgium and Luxembourg country pair as an interesting special case when analysing deviations from the law of one price across EU countries. The price dispersion of Luxembourg relative to Belgium seems to be lower than the price dispersion of other countries relative to Belgium. In 1985, roughly 40 percent of Luxembourg's prices were within a 10 percent band of those in Belgium. In contrast, only an average of 20 percent of prices in other countries satisfy this criterion. As Brussels is roughly as far away from Luxembourg as Amsterdam and Paris are from Luxembourg, Crucini et *al.* argue that the former monetary union between Belgium and Luxembourg is an obvious explanation for their difference to other countries.

More favourable evidence is reported by Lutz (2001) who analyses the European car market during the period 1993 to 1998. The price differentials between Belgium and Luxembourg are on average four percentage points lower after having controlled for factors, such as proximity, common border and shared language.

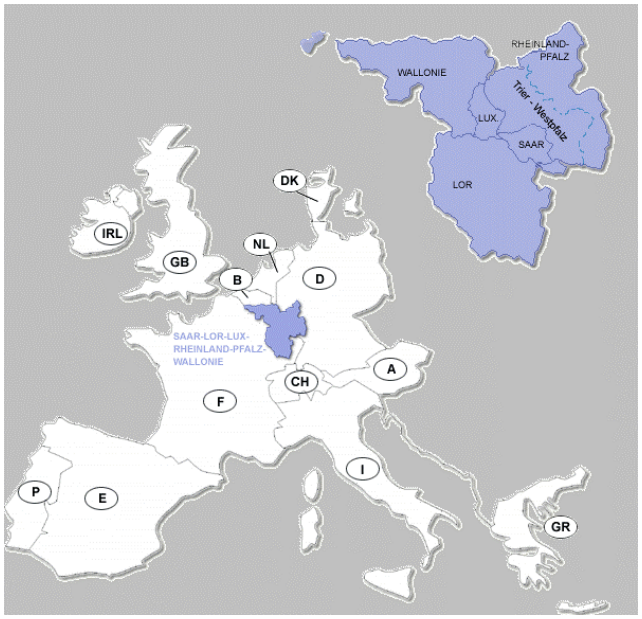
Hence, these specific results support the argument that '*one single currency*' contributes to reducing regional and cross-border price differences in the long term. Strictly speaking however, Belgium and Luxembourg did *de jure* not share the same currency. Thus, it cannot be one single currency *per se* that matters. It is rather the elimination of exchange rate uncertainty and the price transparency associated with the 1:1 conversion rate that seem to be of importance.

3 Regional Price Deviations Using Individual Prices

We now turn to the analysis of the determinants of price deviations in Luxembourg and its surrounding regions. In doing so, we will essentially rely on regional supermarket prices collected between October 2001 and April 2002. Luxembourg and the surrounding regions emerge as a natural candidate for such a study. Firstly, with

relatively short distances between them, the four countries Belgium, France, Germany and Luxembourg border each other. This is graphically displayed in Figure 1.

Figure 1: The "Grande-Region"



The bordering regions are highly integrated relative to other bordering regions in Europe. Of particular interest are the high numbers of cross-border commuters into Luxembourg. In 2000, over 46 000 people commuted from Lorraine to Luxembourg. The number of people commuting from Rhine-Palatinate and Wallonia is around 12 000 and 25 000 respectively. The number of cross-border commuters travelling into the opposite direction is far less significant. This fact is partly related to Luxembourg having three official languages: French, German and Lëtzebuergisch. This makes it easy for French and German speaking people from the regions of Lorraine, Wallonia and Rhine-Palatinate to work in Luxembourg.

Of course, this is only one of the reasons for the asymmetric cross-border movement. The main factor is of an economic nature. Luxembourg benefited of a very prosperous economic development, in particular, in the financial sector in the last twenty years, which, in contrast to other neighbouring regions, such as Lorraine and Saare, successfully compensated the long-lived decline in the steel-manufacturing sector. Hence, the asymmetric cross-border commuting relationship can be pinned down to differences in income, wages and unemployment figures between Luxembourg and the

neighbouring regions. Table 2 shows quite persuasively how inter-connected these regions are. Table 3 presents some basic economic indicators.

Table 2: Cross-border Commuters in the Grande-Region, in 2000

From / To	Lorraine	Luxembourg	Rhine-Palatinate	Wallonia
Lorraine		46 430	2 000	3 660
Luxembourg	200		113	300
Rhine-Palatinate	120	12 464		100
Wallonia	125	25 003	133	

Source: Statistics Rhine-Palatinate.

Table 3: Basic Regional Economic Indicators, in 2000

	Lorraine	**Luxembourg**	**Rhine-Palatinate**	**Wallonia**
GDP per Capita	17716[a]	47030	22286	16312
GDP per Employee	49817[a]	78096	51552	52222
Monthly Gross Wages per Employee	n.a	3727	2918	2834[b]
Harmonised Rate of Unemployment in %	9.9 [a]	2.4 [a]	6.4 [a]	13.4 [a]

Note: In euro and current prices. [a] refers to 1999. [b] refers to 1998.
Source: www.grande-region.lu.

The high number of cross-border commuters necessarily implies that a high share of the population in the bordering regions is in regular contact with different countries, and hence prices in different currencies prior to the introduction of the euro banknotes and coins on the 1 January 2002. This is exactly what we are after. It is more than a stylised fact that there are virtually no petrol stations on the non-Luxembourg side of the border with its neighbouring countries. Motorists, mostly in the form of cross-border commuters, simply make use of the petrol price differences and shop where it is cheapest - they arbitrage. This fact, together with casual evidence that many Luxembourg people do their shopping in the neighbouring cities of Arlon, Metz and Trier, and vice versa, raises our hopes for the present study.

Data Collection

Data on supermarket prices is collected four times, i.e. in mid-October 2001, mid-December 2001, mid-February 2002, and mid-April 2002, and are always collected

within the same week.[8] Prices were collected in large supermarkets in the surrounding region of Luxembourg. The cities concerned are Luxembourg, Trier (Rhine-Palatinate, Germany), Metz (Lorraine, France), and Arlon and Messancy (Wallonia, Belgium). The supermarkets concerned are *Cactus* and *Auchan*, both in Luxembourg, *Auchan* in Metz-Woippy, *Carrefour* in Arlon, *Cora* in Messancy, which is south of Arlon and somewhat closer to the Belgian-French border, and *Extra* in Trier. A description of the respective location is provided in Table 4. A description of the distance between supermarkets is presented in Table 5.

Table 4: Location of Supermarkets

Country	Location	Supermarket	Location
L	Luxembourg	Auchan	Shopping centre Kirchberg
L	Luxembourg	Cactus	Shopping centre Belle Etoile, Bertrange
B	Arlon	Carrefour	Shopping centre direction Luxembourg
B	Messancy	Cora	Shopping Centre
F	Metz-Woippy	Auchan	Shopping centre in Metz-Woippy towards Luxembourg
G	Trier	Extra	Outskirts of city centre towards Luxembourg

Table 5: Distance between supermarkets in the Region

Between	Luxemb.-Kirchberg	Arlon	Messancy	Metz-Woippy	Trier
Luxembourg Bertrange	11.7	20.2	23.1	68.3	57.3
Luxembourg Kirchberg		32.3	34.0	68.6	37.8
Arlon			8.6	87.8	75.3
Messancy				88.7	77.1
Metz-Woippy					103.0

Note: Distances are based on the fastest way to reach respective destination.
Source: www.mappy.com

Essentially, we have price data on 6 different supermarkets, on 92 products collected at four different points in time. As we analyse pair-wise observations, we would obtain 5520 (=92x15x4) observations, if the panel were fully balanced.[9] However, not all products were available everywhere. Some observations were removed, in particular if

[8] In other words, the first two price collections took place prior to the introduction of euro notes and coins. The third collection took place during the time of dual circulation of the respective former national currencies and the euro. The fourth price collection was undertaken when the euro was the only legal currency unit in the four countries concerned.

[9] The supermarket *Carrefour* in Messancy is taken as numéraire in all our estimations.

serious doubts with regard to the correctness of the displayed price existed.[10] This leaves us with almost 3,600 valid observations for estimation. Detailed information on individual products included in the empirical analysis may be found in the Appendix.

Which products were selected? The following considerations have guided us. Firstly, in order to compare the prices, the products included should ideally be tradable and identical, which led us to focus on branded products. Of course, it is virtually impossible to accomplish the latter requirement, as products are, by the nature of the analysis, spatially differentiated. Furthermore, except for the prices collected in *Auchan* in Luxembourg and Metz, prices were collected in supermarkets belonging to different retail chains. This may potentially introduce further production differentiation, as products may also be differentiated according to qualitative characteristics of the sales point. We will analyse whether this is indeed the case.

Empirical Implementation

In essence, we would like to know whether price deviations depend on transactions costs. We define $\left|\ln(P_{i,k,t} / P_{j,k,t})\right| = \left|\ln(p_{i,k,t} / q_{i,k,t}) - \ln(p_{j,k,t} / q_{j,k,t})\right|$ as the absolute percentage price difference of product *k* between two locations *i* and *j* at time *t*, where $p_{i,k,t}$ and $q_{i,k,t}$ refer to the respective price and quantity.

Hence, product prices are normalised, as compared products are not always available in equal quantities – a violation of the identical goods requirement of LOP and a potential source of product differentiation, which may affect the estimations. In order to account for this potential source of product differentiation, we firstly control for quantity differences in price comparisons in explicitly including the absolute percentage point difference in packaging size $\left|\ln(q_{i,k,t} / q_{j,k,t})\right|$ as an additional variable into the regression. The idea is that the larger the quantity differences, the larger the absolute price difference will be. In other words, bulk shopping pays.[11] Secondly, we

[10] Promotions are generally not easy to detect, except if they are clearly displayed. This led us to include all prices except if promotions involved changed product sizes or other freebies.

[11] If bulk shopping does not pay, or expressed differently, if product quantity differences do not introduce product differentiation, then the estimated coefficient should turn out to be insignificant.

eliminate this potential source of product differentiation in comparing products with equal quantities only. These regressions are denoted with the suffix *–R.*

A summary statistic is presented in table 6. Prices between two different locations may differ at any point in time. However, these differences cannot be arbitrarily large, as they are bounded by the size of the transaction costs. We expect $\left|\ln(P_{i,k,t} / P_{j,k,t})\right|$ to be positively related to transaction costs, which are approximated by distance, borders and not sharing the same currency.

Table 6: Absolute Percentage Price Difference Summary Statistics

Date	Mean	Standard deviation	Minimum	Maximum	Number of Observations
Oct. 2001	0.1389	0.1266	0.0000	0.9087	800
Dec. 2001	0.1375	0.1282	0.0000	0.9087	918
Feb. 2002	0.1325	0.1228	0.0000	0.9029	914
Apr. 2002	0.1423	0.1340	0.0000	0.9163	930
Overall	0.1378	0.1278	0.0000	0.9163	3562

Empirical Results

The Effect of Distance on Absolute Price Differences

All estimated results are shown in respective tables in the Appendix. Regression *A* presents the results for Random Effects estimations, where the grouping variable refers to the observed products as listed in the appendix.[12] The results clearly indicate that distance matters. Despite the low variation in the explanatory variable, the estimated coefficient is positive and is highly significant at the 1 percent level throughout all regressions. This result suggests that increasing the distance between supermarkets by 1 percent, i.e. about 400 metres, increases the percentage price difference by 0.025 percent. In order to get an idea of how important distance is for explaining price differences, we notice that the average of log distance is 3.703, meaning that, on average, distance adds 0.09 (=0.025*3.703) to the percentage price difference, thereby accounting for 67 percent of the total. Regression *II-A* explores the possibility of a non-linear relationship. The results indeed suggest that the absolute percentage price

[12] Within and Full Maximum Likelihood Random Effects estimations were also run. Both results were very similar to the GLS Random Effects estimations and are therefore not reported separately. See also the Hausman statistic, which indicates that the zero-correlation assumption between v_i and x_{it} in the Random effects estimation is not rejected by the data.

difference increases with distance, but at a declining rate. Both the coefficients of distance and distance squared are significant at the 1 percent level.

It is remarkable that we able to replicate some of the main results of recent international price studies, despite the small geographical coverage and the high degree of integration between the regions. Note that the average distance between supermarkets in this study is about 40 kilometres, while it is above 1000 kilometres for most international price comparisons.

The Effects of Borders and the Belgian-Luxembourg Monetary Association

Before discussing the estimated results, it is time for an explanatory note. Firstly, due to possible multi-collinearity problems, we also choose to analyse the border and currency area effects in a separate regression, where distance is excluded.[13] Secondly, the monetary association dummy does only consider whether price differences are on average smaller within the former Belgian and Luxembourg monetary association and does not consider the introduction of the euro on 1 January 2002. The idea is that results for the Belgian-Luxembourg monetary association may provide an indication of what to expect of the euro in the long-term.[14]

The results in regression *III-A* indicate that price differences are on average lower in the Belgian-Luxembourg monetary association, having taken into consideration distance effects. Similarly, the results reported in regression *IV-A* show very clearly that both borders and the monetary association matter. The coefficient on the border dummy is highly significant, as is the monetary association dummy. Judging from the point estimates, crossing the border is equal to increasing the absolute percentage price deviation by 4.2 percentage points, while being inside the former Belgian-Luxembourg

[13] The correlation coefficient between log of distance and border dummy is 0.75, while it is –0.85 between log of distance and the Belgian-Luxembourg monetary association dummy. Regressions including distance, borders and the monetary association dummy are not reported separately, as these regressions consistently return t-statistics lower than 1 for the border effect.

[14] The respective national currency unit in circulation was only removed with the introduction of euro banknotes and coins in the beginning of January 2002, meaning that for consumer purposes, BEF and LUF were considered ‘one money’, while this was not the case for the DEM and FRF. Furthermore, the euro was not in place for a period long enough to trigger sufficient reductions in absolute percentage price deviations. This seems to be a rather short time span considering the rather slow convergence speeds reported in the literature (e.g. Obstfeld & Rogoff, 2000).

monetary association reduces the absolute percentage price deviation by between 1.3 and 1.8 percentage points, depending on the specification. These estimates indicate that, on average, the border accounts for 30 percent of the observed percentage price differences, while the single currency in the Belgian-Luxembourg case accounts for 9 to 13 percent of the reduction therein. Again, it is rather remarkable that we receive affirmative results despite the small sample size and highly narrow geographical coverage.

Taking the obtained results at face value, we may indeed conjecture the adoption of the euro to lead to reductions in average absolute percentage price deviations for similar or identical products across regions or countries. For the regions within the Grande Region, these results suggest that the deviations in supermarket prices between regions using different monetary units prior to the introduction of the euro banknotes and coins to the public can be expected to diminish in the medium to long term.

Effects of Packaging Size Differences and Retail Group Membership

While the previous discussion focused on the geographical determinants of price deviations, we will now turn to the effects of packaging size differences and belonging to the same supermarket chain. One great advantage of the present data set is that we can explicitly control for price differences stemming from the comparison of products sold in different quantities, which in itself is a violation of the identical goods requirement. Most other data sets, however dis-aggregated they may be, use averages over different sales points within a city or country. Hence, packaging size differences are subsumed into an average figure, rendering an explicit analysis of the price deviations related to differences in observed product sizes impossible.

It is common knowledge that products double in size are normally less than twice as expensive. Bulk shopping pays. Hence, normalising product quantities may not be sufficient to ensure the comparison of equals. We include the absolute percentage difference in product quantities as an additional variable in the regressions in order to explicitly account for the additional product differentiation introduced by the comparison of prices referring to different quantities. The results presented in Table 7 indicate, as expected, that larger absolute differences in packaging sizes (q), imply

larger absolute percentage price deviations. The corresponding economic interpretation is that differences in consumer preferences and retail structures matter. This interpretation emanates if we regard this variable as a retail structure control variable. This result is consistent with the finding of the European Commission (2001c), reporting that packaging size differences are partly to be held accountable for price level differences between countries. Countries with a high share of supermarkets have a seemingly higher price level than countries with a high share of hypermarkets.[15]

Similarly, the dummy variable indicating whether the observed prices stem from the same supermarket chain, as is the case for *Auchan* Luxembourg and *Auchan*, Metz, is significantly negative. More specifically, comparing product prices collected in different supermarket chains adds 2.5 percentage points to the average percentage price difference. Hence, this fact contributes up to 18 percent of the observed price differences. This is far from negligible. This result supports the idea that products are not only differentiated along the spatial dimension, but also according to the characteristics of the sales point. In a sense then, these results tend to support Goldberg & Knetter (1997) who make the closely related point that one weakness of studies analysing the empirical validity of LOP is to use prices of goods that are produced and sold in different locations, thus violating the identical goods assumption.

Sensitivity of Estimates

The following tables present some alternative estimation results, allowing us to assess how robust the results are. Regression *B* refers to a combined regression, whereby the panel is collapsed into one cross-section, in using the Between estimator on each supermarket-pair per product, of which there are a maximum 15. In doing so, the panel can be reduced to one cross-section, while still using product-specific fixed effects. This is possible, as a single product and period combination does not uniquely identify an observation in this panel.

[15] Regressing the percentage price difference on the percentage quantity difference in non-absolute terms using the Random effects estimation method as in Table 7 returns a coefficient of -0.040 with a standard error of 0.013, providing confirmation that the sign of the coefficient is as expected.

Regression *C* makes use of generalised cross-sectional times series estimation techniques, allowing the specification of the unstructured within-group correlation structure in the panel.[16] In order to do so, the stratification by cross-section and period must identify one unique observation. This is not the case for a single product and period combination, as for each product a maximum of 60 observations may exist, containing 15 supermarket-pairs and 4 time periods. Similarly to Regression *B*, the stratification variable identifies a group as a combination of each product and supermarket-pair. Hence, these regressions implicitly take into consideration both individual product and supermarket-pair error components.

All in all the results are remarkably robust. The coefficients of the distance terms and the border dummy remain highly significant throughout the alternative estimation methods. The size of the distance and border coefficients are largely unaffected by the estimation method. Furthermore, these coefficients seem not to be affected by the inclusion or exclusion of observations with packaging size differences. In contrast, the Belgian-Luxembourg monetary association dummy and the supermarket dummy for *Auchan* Luxembourg and Metz react sensitively to the inclusion of packaging size differences in the regressions. Excluding observations with quantity differences, the coefficient of the supermarket dummy retains significance regardless of the estimation method, while the Belgian-Luxembourg monetary association dummy retains significance in regressions *IV-B-R* and *IV-C-R*.

This clearly indicates that (further) violation of the identical goods (i.e. quantity) assumption may change results. The coefficient of the difference in packaging size is highly significant and largely unaffected by different estimation methods. This indicates not only how important it is to control for this factor, but also that, despite the inclusion of this control variable, not all associated price variations can be absorbed. This in turn influences the estimation results of the other variables. Similarly, the high degree of multicollinearity between distance and the currency dummy is not innocuous, and is incidentally the reason leading to the exclusion of

[16] We also ran regressions assuming first order autocorrelated residuals. Judging from the Wald-Chi^2 statistic, regression *C* performed better. The AR(1) autocorrelation structure is probably to strict an assumption, which also becomes apparent when looking at the estimated autocorrelation matrices shown in the appendix.

distance in specification *IV* in the first place. The non-robustness of the Belgian-Luxembourg monetary association dummy in specification *III-C* may additionally relate to the fact that, while not explicitly estimating the respective group-specific coefficients, regression *C* implicitly allows for different error components for each product-specific supermarket-pair. This may remove some of the variation across supermarket-pairs normally attributed to the monetary association.

4 Concluding Remarks

The continued effort to reduce non-tariff barriers and other market imperfections in the EU has not gone unnoticed. Price differences of quasi-identical goods have diminished in the past. Recently, concern has arisen about the continued process of price convergence. The euro may be a decisive tool in this respect and may provide the essential stimulus for markets to integrate further. The euro eliminates the exchange rate volatility and increases price transparency within the euro area. Yet, it is unclear to what extent this also implies reductions in price dispersion across countries.

The empirical results obtained in this paper generally support the argument that price deviations increase as transaction costs increase. More specifically, the absolute percentage price difference is increasing in distance, but at a decreasing rate. Similarly, crossing borders increases the price deviations, while being inside the former Belgian-Luxembourg monetary association reduces price deviations. This points towards '*one money*' and price transparency achieving the desired effects. These results are rather remarkable given the narrowly defined geographical area under investigation and the high degree of integration between these bordering regions. It is of particular relevance in this respect that other cross-country studies also report that price differences between Belgium and Luxembourg are smaller than between other EU country pairs, not only because they are close to each other, but also because they shared a *quasi*-single currency prior to the adoption of the euro. This raises our hopes that the euro will reduce regional and cross-border price differences in the euro area in the long-term.

The data set also allows us to explicitly analyse how the deviations from the law of one price are influenced by packaging size differences and the comparison of products

from supermarkets belonging to different retail chains. This is a particular feature of this data set, which many other international data sets do not share. The results are affirmative. The results clearly suggest that, despite product quantity normalisation, packaging size differences matter. Additionally, price differences are on average smaller if prices are compared within the same supermarket group. Hence, it is important to control for such factors, as they introduce further undesirable product differentiation – poison when estimating deviations from LOP. These results also indicate that cross-country differences in consumer preferences and retail structures are of relevance, which is in line with the assessment of the European Commission (2001c).

Finally, it has to be borne in mind that the presented analysis can serve only to provide some initial results, which are at best indicative. A more complete analysis of the euro convergence effects will have to be postponed to a later date. Similarly, the analysis of price deviations will have to be extended along the time series dimension and be widened to include a larger variety of products.

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6 Appendix

Table 7: Random Effects Estimation Results

Regression	I-A	II-A	III-A	IV-A	I-A-R	II-A-R	III-A-R	IV-A-R
Estimation Technique	Random Effects GLS				Random Effects GLS			
No. of obs.	3562				3010			
No. of groups	92				92			
Obs. per grp:								
Minimum	7				4			
Average	38.7				32.7			
Maximum	60				60			
Dep. Variable	$\lvert\ln(P_{i,k,t} / P_{j,k,t})\rvert$				$\lvert\ln(P_{i,k,t} / P_{j,k,t})\rvert$			
ln*(distance)*	0.025 ***	0.131 ***	0.142 ***		0.025 ***	0.130 ***	0.152 ***	
	0.002	0.024	0.025		0.003	0.025	0.026	
*(*ln*(distance))*^{2}		-0.015 ***	-0.018 ***			-0.015 ***	-0.020 ***	
		0.003	0.004			0.004	0.004	
Border				0.042 ***				0.037 ***
				0.006				0.006
Bel-Lux MA			-0.013 *	-0.018 ***			-0.023 ***	-0.021 ***
			0.008	0.004			0.009	0.005
Superm. dmy	-0.024 ***	-0.025 ***	-0.027 ***	-0.025 ***	-0.039 ***	-0.039 ***	-0.043 ***	-0.040 ***
	0.007	0.007	0.007	0.007	0.012	0.008	0.008	0.008
$\lvert\ln(q_{i,k,t} / q_{j,k,t})\rvert$	0.082 ***	0.081 ***	0.082 ***	0.082 ***				
	0.010	0.010	0.010	0.010				
R-Squared	0.33	0.34	0.34	0.34	0.33	0.34	0.34	0.34
Wald-Chi^2	210.2 ***	231.0 ***	233.7 ***	230.2 ***	99.8 ***	117.9 ***	125.2 ***	117.4 ***
Hausman Test	0.96	1.00	1.37	0.42	2.24	3.36	3.29	2.48
LM Test of $v_i = 0$	5662.7 ***	5702.4 ***	5717.7 ***	5706.0 ***	4966.1 ***	5030.9 ***	5065.6 ***	5028.4 ***

Note: Standard Errors in smaller font. *, **, *** denotes significance at the 10%, 5%, and 1% level, respectively. Constant included, but not reported. Time effects not included, as they are neither individually nor jointly significant. Specification *–R* excludes observations with $|\ln(q_{i,k,t} / q_{j,k,t})|>0$.

Table 8: Collapsing into One Time Period

Regression	I-B	II-B	III-B	IV-B	I-B-R	II-B-R	III-B-R	IV-B-R
Estimation Technique	OLS Between & product-specific fixed effects				OLS Between & product-specific fixed effects			
No. of obs.	1002				847			
No. of groups	92				92			
Obs. per grp:								
Minimum	3				1			
Average	10.9				9.2			
Maximum	15				15			
Dep. Variable	$\lvert\ln(P_{i,k,t} / P_{j,k,t})\rvert$				$\lvert\ln(P_{i,k,t} / P_{j,k,t})\rvert$			
ln*(distance)*	0.026 ***	0.128 ***	0.139 ***		0.026 ***	0.127 ***	0.149 ***	
	0.004	0.042	0.043		0.005	0.043	0.046	
*(*ln*(distance))*^{2}		-0.015 **	-0.017 ***			-0.015 **	-0.020 ***	
		0.006	0.007			0.006	0.007	
Border				0.043 ***				0.039 ***
				0.010				0.010
Bel-Lux MA			-0.011	-0.018 **			-0.021	-0.021 ***
			0.014	0.007			0.015	0.008
Superm. dmy	-0.019	-0.019	-0.021 *	-0.019	-0.037 ***	-0.038 ***	-0.041 ***	-0.038 ***
	0.013	0.013	0.013	0.013	0.014	0.014	0.014	0.014
$\lvert\ln(q_{i,k,t} / q_{j,k,t})\rvert$	0.078 ***	0.078 ***	0.078 ***	0.079 ***				
	0.017	0.017	0.017	0.017				
R-Squared	0.39	0.39	0.39	0.39	0.39	0.39	0.39	0.39
F-Test	22.1 ***	18.2 ***	14.7 ***	18.3 ***	17.4 ***	13.5 ***	10.7 ***	13.7 ***

Note: Standard Errors in smaller font. *, **, *** denotes significance at the 10%, 5%, and 1% level, respectively. Constant included, but not reported. Specification *–R* excludes observations with $|\ln(q_{i,k,t} / q_{j,k,t})|>0$.

Table 9: Accounting for Auto-correlated Residuals

Regression	I-C	II-C	III-C	IV-C	I-C-R	II-C-R	III-C-R	IV-C-R
Estimation Technique	Iterative GLM				Iterative GLM			
Robust std. err.	Semi-robust				Semi-robust			
Autocor. Str.	Unstructured				Unstructured			
No. of obs.	3562				3010			
No. of groups	1002				847			
Obs. per grp:								
Minimum	1				1			
Average	3.6				3.6			
Maximum	4				4			
Dep. Variable	$\lvert\ln(P_{i,k,t} / P_{j,k,t})\rvert$				$\lvert\ln(P_{i,k,t} / P_{j,k,t})\rvert$			
ln*(distance)*	0.023 ***	0.152 ***	0.158 ***		0.025 ***	0.133 ***	0.146 ***	
	0.005	0.045	0.051		0.005	0.048	0.055	
*(*ln*(distance))*^{2}		-0.019 ***	-0.020 **			-0.016 **	-0.019 **	
		0.007	0.008			0.007	0.009	
Border				0.047 ***				0.041 ***
				0.010				0.010
Bel-Lux MA			-0.007	-0.012			-0.013	-0.017 *
			0.018	0.008			0.020	0.009
Superm dmy	-0.022 *	-0.023 *	-0.024 *	-0.022	-0.037 ***	-0.037 ***	-0.039 ***	-0.037 ***
	0.014	0.014	0.014	0.014	0.012	0.012	0.013	0.013
$\lvert\ln(q_{i,k,t} / q_{j,k,t})\rvert$	0.084 ***	0.084 ***	0.084 ***	0.085 ***				
	0.017	0.017	0.017	0.017				
Wald-Chi^2	62.3 ***	76.6 ***	77.3 ***	70.8 ***	27.1 ***	39.8 ***	39.7 ***	34.2 ***

Note: Standard Errors in smaller font. *, **, *** denotes significance at the 10%, 5%, and 1% level, respectively. Constant included, but not reported. Time effects not included, as they are neither individually nor jointly significant. Specification *–R* excludes observations with $|\ln(q_{i,k,t} / q_{j,k,t})|>0$.

Estimated within product-specific supermarket-pair correlation matrix R:

Regression I-C

	C1	c2	c3	C4
R1	1.0000			
R2	0.8300	1.0000		
R3	0.6764	0.8171	1.0000	
R4	0.7689	0.8460	0.7899	1.0000

Regression II-C

	C1	c2	c3	C4
R1	1.0000			
R2	0.8301	1.0000		
R3	0.6728	0.8201	1.0000	
R4	0.7646	0.8462	0.7884	1.0000

Regression III-C

	C1	c2	c3	C4
R1	1.0000			
R2	0.8299	1.0000		
R3	0.6734	0.8196	1.0000	
R4	0.7651	0.8458	0.7885	1.0000

Regression IV-C

	C1	C2	C3	C4
R1	1.0000			
R2	0.8312	1.0000		
R3	0.6737	0.8183	1.0000	
R4	0.7670	0.8461	0.7876	1.0000

LIST OF SUPERMARKET PRODUCTS INCLUDED IN ESTIMATIONS

Product Name		Observed Quantities	Product Name		Observed Quantities
After Eight Chocolates	Kg	0.20, 0.25, 0.30	Leffe Blonde Beer Bottle	Litre	4x0.33, 6x0.25
Ajax	Litre	1.00, 2.00	LO Salt	Kg	0.35
Ariel Essential, Washing Powder	Kg	1.35, 2.25	LU Tuc Crackers	Kg	0.10, 3x0.10
Bacardi Rum	Kg	0.70	Maggi Arome, 1 kg	Kg	1.00
Bahlsen Chips, Original Paprika	Kg	0.10	Maggi Arome, 250 gr	Kg	0.25
Bahlsen Schoko Leibnitz, Chocolate Biscuits	Kg	0.125	Magnum Ice Cream Classic	Unit	3
Bailey's, Crème Liqueur	Litre	0.70	Mars Chocolate Bar	Unit	3, 5, 6, 10
Barilla Spaghetti long	Kg	0.50	Mars Ice Cream	Unit	6
Barilla Spaghetti No. 5	Kg	0.50	Martini Bianco, Regular	Litre	0.75, 1.00
Barilla Spaghettini No. 3	Kg	0.50	Martini Bianco, 1.5 l	Litre	1.50
Bic Chrystal, Biro Pen, Blue	Unit	2	Melitta Coffee Filters, 100	Unit	100
Boss Stabilo, Highlighter Pen, Yellow	Unit	1	Melitta Coffee Filters, 80	Unit	80
Bounty Chocolate Bar	Unit	8	Milka Chocolate	Kg	0.10, 0.20
Calgon, Antikalk, Washing Powder	Kg	3.00	Minute Maid, Orange Juice	Litre	1.00
Campari Bitter	Litre	0.70, 1.00	Mr Proper Citrus	Litre	1.50
Canderel 100, Sweetener	Unit	100	Nestle Nesquik	Kg	0.80, 1.00
Canderel 300, Sweetener	Unit	300	Nivea Crème	Litre	0.15
Canderel Powder 40, Sweetener	Kg	0.04	Nivea Crème Soft	Litre	0.20
Canderel Powder 75, Sweetener	Kg	0.075	Nivea Deo Roll-on, Sensitive, 0% Alcohol, 0% Perfume	Litre	0.05
Coca Cola Can	Litre	0.33	Nutella Chocolate Spread	Kg	0.40
Coca Cola, Glass Bottle, 1 l	Litre	1.00	OB Tampons, Normal, Without Applicator	Unit	32
Coca Cola, Pet Bottle, 1.5 l	Litre	1.50	Pampers, Premium, Baby Dry, Junior, 12/25 kg	Unit	80
Coca Cola, Pet Bottle, 2 l	Litre	2.00	Pepsi Cola Can	Litre	0.33
Cointreau	Litre	0.70	Pepsi Cola, Pet Bottle, 1.5 l	Litre	1.50
Colgate Total, Toothpaste	Kg	0.075	Persil Megaperls, Washing Powder	Kg	1.35
Colgate Total Fresh Stripe, Toothpaste	Kg	0.075	Post It Notes, 76 x 76 mm	Unit	100
Cote d'Or, Chocolates, Lait Noisettes	Kg	0.20	Pringles, Original	Kg	0.20
Dove Crème Douche	Litre	0.25, 0.40, 0.50	Pritt Stick, Glue	Kg	0.01, 0.02
Gillette Shaving Gel, Cool Wave	Litre	0.20	Rexona, Antitranspirant 24h, Stick, Blue	Litre	0.04, 0.05
Gillette Razor Mach 3, 4 blades	Unit	4	Ritter Sport Chocolate	Kg	0.10
Gillette Razor Mach 3, 8 blades	Unit	8	Schweppes, Indian Tonic Water	Litre	0.75, 1.00, 1.50
Gordon's Dry Gin	Litre	0.70	Snickers Chocolate Bar	Unit	3, 5, 6
Granini, Multivitamin	Litre	0.70, 1.00	Snickers Ice Cream	Unit	6
Hansaplast, Universal, Water-resistant, 1m x 6cm	Unit	1	Sugar, Refined	Kg	1.00
Haribo, Wine Gum, Goldbären	Kg	0.20	Tampax, Regular, With Applicator	Unit	20, 30
Head & Shoulders, Shampoo, Classic Blue	Litre	0.30	Tempo Tissues	Unit	150, 300
Heineken Beer	Litre	0.33, 6x0.33	Tipp Ex Rapid	Unit	1
Hoegaarden Beer, Bottle	Litre	6x0.25	Toblerone, Chocolate	Kg	0.10, 0.40
Johnny Walker Whisky, Red Label	Litre	0.70	Toffifee Chocolate	Unit	15, 48
Kellogg's Cornflakes, 375gr	Kg	0.375	UHU Glue	Kg	0.0082
Kellogg's Cornflakes, 500gr	Kg	0.50	Uncle Ben's Rice, Long Grain, 1kg	Kg	1.00
Kellogg's Cornflakes, 750gr	Kg	0.75	Uncle Ben's Rice, Long Grain, 500gr	Kg	0.50
Kellogg's Smacks, 375gr	Kg	0.375	Vittel, Mineral Water	Litre	6x1.5
Kinderschokolade	Kg	0.10	Toilette Duck, White	Litre	0.75
Kleenex Balsam Tissues	Unit	12x9, 12x10	Wheetabix Breakfast Cereal	Kg	0.43
Labello Lip Balm, Classic Blue	Unit	1	Whiskas, Cat Food	Kg	0.40, 0.80