On-line Retailers Versus the High Street: An Analysis of Pricing

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1. Introduction

Over the last decade the internet has revolutionised the way in which individuals and firms communicate with one another, and the manner in which information is generated, shared and retrieved. It is now going on to radically change the way in which we buy goods and services, leading to a rapid expansion of on-line retailers and a decline of many traditional shops on the high street. The rise in on-line sales has come about through a combination of factors:

- sharply rising proportion of households with a broadband connection
- fall in the price and improved performance of computers
- development of relatively safe and convenient ways of paying for transactions though internet banking
- growing IT skills and confidence of consumers in using computers
- lower prices available on-line
- growing number of retailers offering their goods on-line

According to research for the Centre for Retail Research (CRR) by Kelkop, the value of on-line retail sales in the UK in 2011 was £50.34 bn and accounted for 12.0% of total retail sales in the year. The UK had the highest proportion of on-line sales of any country in Europe, and was higher even than in the USA (9%) which had initially led the way in internet retailing. The CRR estimates that on-line retail sales in the UK grew by 5.8% in 2012 and forecasts that they will increase by 10% in 2013, taking their share of total retail sales to 14%. This remarkable growth is set in the context of the slow growth still seen in the British economy.

The purpose of this article is to provide an economic analysis of how the internet affects prices, sales, costs and competition in retailing. In Section 2 we sketch out the historical context of retailing in the UK over the last

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half century, while in Section 3 we develop a model of retailing. Section 4 provides a brief summary and conclusion.

2. Historical context

One might expect that we could find a model of retailing in any standard textbook on economics, but strangely this is not the case. As far back as the early 1970s, Tucker (1975) observed "*the complexities of relationships between suppliers and customers should be a fruitful area for the attention of the applied micro-economist. Instead, they are often deterred by this very feature from venturing beyond the calm of the theoretical models of consumer behaviour and the theory of the firm*" (p.8)

Nearly four decades on, little has changed. For example, the classic modern textbook on economics by Begg et alia (2007) barely touches on this area. One reason for this seems to be the eagerness of authors to get into the analysis of supply and demand. On the supply side the emphasis is on costs which are typically analysed from the manufacturing viewpoint – from the laws of production we get the shape of cost curves and hence we derive the supply curve for the industry. On the demand side, the nature of individual consumer demand is analysed and then aggregated to get the market demand curve. Authors then head straight into the analysis of supply, demand and equilibrium prices and output.

Lost in the slipstream of all this is the fact that most consumers do not buy goods directly from firms that make them. We generally buy our food in supermarkets, cars from motor dealers, washing machines from electrical retailers, clothes from fashion outlets and so on. There are usually intermediaries between the manufacturer and the consumer – distributors, wholesalers and retailers – determining the range of goods for sale and their prices. There are, however, some firms which sell directly to consumers – for example, until recently Dell manufactured its own computers and sold them directly to consumers without any intermediate retailers. Similarly, Ringtons in the north of England produces its own blend of teas and sells them directly to consumers using its own delivery service, with no retail outlets. But these examples are the exceptions – in general we buy most of our goods and services through retailers. So, we need to adapt the theory of the firm to explain how retailers set prices and determine the associated volume of sales.

However, before we develop such a theory we need some historical context of retail pricing. Up to the early 1960s the prices of goods in the

UK were set by manufacturers rather than retailers – the so-called practice of Resale Price Maintenance (RPM). At that time no retailer could discount prices from what the manufacturer decided – often called the 'list price'. If they did so, the manufacturer was legally entitled to refuse to supply them with its goods. Retailers made their profit by being able to buy supplies of the product from the manufacturer at a discount, often known as the 'trade discount'. In effect the manufacturer's price was the price paid by the consumer and so there was no pressing need for a separate theory of retail pricing at the time.

However, all this was to change. This practice of RPM by manufacturers was widely viewed by economists as a restrictive practice (see Yamey, 1964) in not allowing price competition between retailers, and was finally abolished in the Resale Prices Act of 1964. This resulted in a revolution in retailing in the UK, allowing the growth of supermarkets and discount stores. Retailers suddenly became 'price makers' rather than 'price takers' from the manufacturers. There were a limited number of exceptions to this open competition but these have gradually disappeared over time. The last two of these were firstly, one protecting independent booksellers from discounting of books, and secondly, another protecting independent pharmacists from discounting of non-prescription drugs by supermarkets. These exemptions have now been terminated allowing full price competition between retailers in all sectors.

When RPM was ended, manufacturers were allowed to quote a Recommended Retail Price (RRP) in its place, and this is still widely used today. It serves as a reference point from which retailers could discount in order to show the 'saving' to the consumer. The use of RRP can, however, be misleading to consumers. Retailers are allowed to advertise 'savings' on RRP provided the good had been on sale at the full RRP for a given minimum time (usually about 3 weeks) at one of their stores in the country – but not necessarily in the stores in which most consumers are making their purchase. Hence retailers are technically complying with the law, but many consumers may be misled into thinking they have obtained a bargain. The problems with RRPs in the electrical goods industries (televisions, music systems, washing machines etc) led the Monopolies and Mergers Commission to ban the quoting of RRPs in this sector in 1998. However, following recent complaints by independent retailers about competition from on-line retailers, the Competition Commission is currently considering whether to overturn the 1998 decision.

All of these developments pointed to a need for a new theory that provided the explanation of consumer prices in the retail sector. However, after half a century of price competition between retailers, it is still missing. The next section aims to remedy this.

3. A theory of retail pricing

Our starting point is to take a single small retailer selling only one good, which is supplied from a manufacturer. Although the retailer is small, it is a price setter since it faces a downward sloping demand curve. Consumers do not generally want to spend large amounts of time and money comparing prices from all possible retailers; and this confers a degree of market power for the retailer over a local area. The extent to which the retailer has discretion on price depends on the nature of the good and the extent of local competition. Non-price competition such as advice on the product, interest-free credit or the provision of after-sales service, may also give the small independent retailer an element of market power.

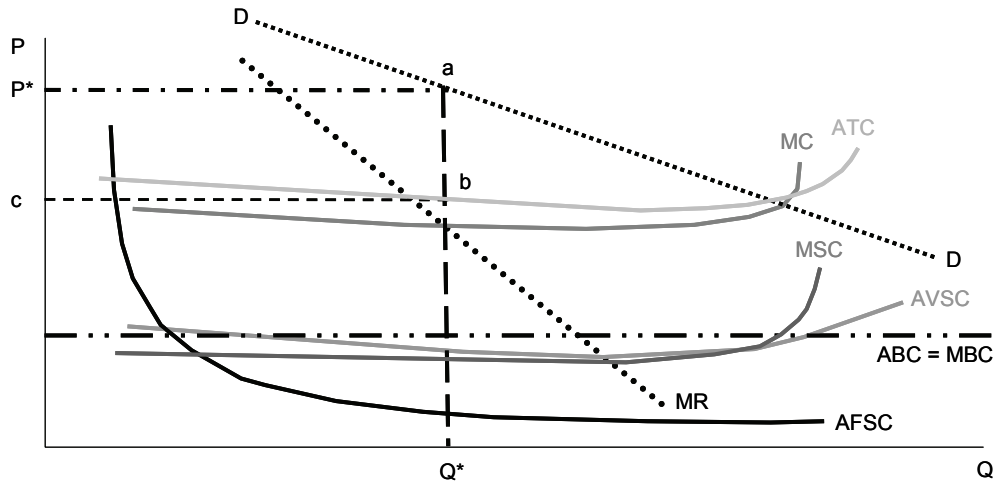
On the cost side we need to consider various components, which are somewhat different in nature to those in manufacturing. Some costs are fixed in the short run with respect to sales of the good – these include rent on property, business rates, insurance, security, accounting charges and the fixed elements of energy, water, telephone and transport costs. Other costs are variable in nature and will alter with the volume of sales. Most of these will relate to labour – the number of sales people employed and the hours which they work. In addition, there are the variable elements of energy, water, telephone and transport costs. Finally, there is the cost of the goods bought from the manufacturer or wholesaler for resale.

We bring these elements together in Fig 1 below. The demand curve for the product is DD and has its associated marginal revenue curve MR. On the cost side, fixed costs can be divided by the volume of sales to generate the Average Fixed Selling Cost curve AFSC, which declines rapidly initially, then more gently, and finally becomes almost horizontal (mathematically its shape is a rectangular hyperbola). The shape of the Average Variable Selling Cost curve (AVSC) is likely to be different to the traditional U-shaped curve in manufacturing industries. Labour in the form of managers, sales assistants, accounts staff and customer service workers are applied to the given size of retail unit, to generate the sales. It is likely that these costs will be relatively stable over a wide range of sales levels. However, as the capacity constraints of the store are reached,

costs are likely to rise sharply – floor space limitations eventually result in crowding, queues at tills; security may be compromised, and sales lost because customers become frustrated. This may be partly overcome by increasing labour at peak times – hiring part-time labour or paying overtime – but eventually the size of the outlet sets an upper limit to sales. As the limit of the fixed inputs is reached labour costs increase and transactions take much longer. As a result Average Variable Selling Cost curve AVSC is shown as almost constant over most sales levels, but rising sharply as capacity is reached; the associated Marginal Selling Cost curve MSC shows a similar pattern.

Finally, there is the cost of purchasing the goods from the manufacturer. We may call this the Average Buying Cost (ABC). Most small businesses pay the same amount per unit for their supplies from a wholesaler or manufacturer; there are no quantity discounts, since all orders are small. As a result the ABC function is horizontal, and the associated marginal curve MBC coincides with it.

Figure 1: High street trader – no quantity discounts

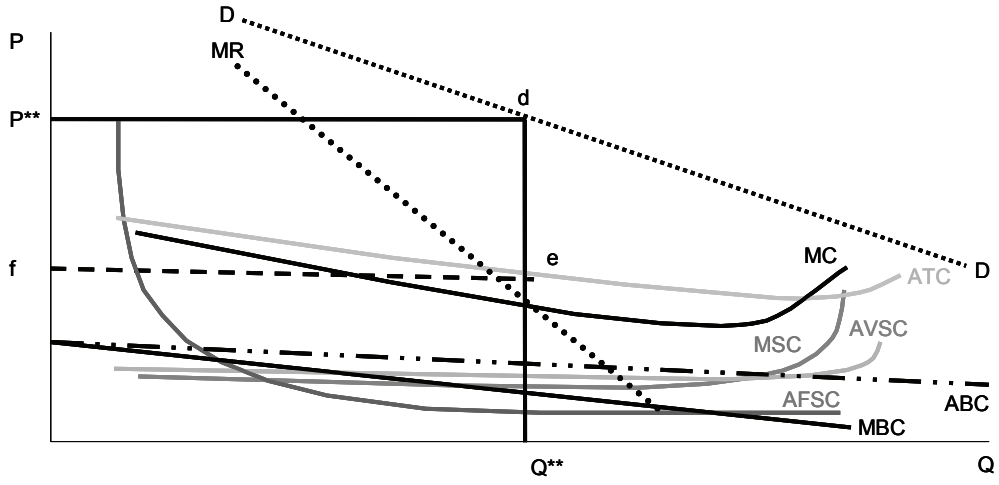


We now need to add the selling and buying cost to generate Average Total Cost curve ATC and the Marginal Cost curve MC, as shown in Fig 1. Assuming that the retailer wishes to maximise profits then it should set prices where MC equals MR from the conventional marginal rule. The optimal price is therefore P* and the volume of sales per unit of time is Q*. The profit margin on each sale is P*c and the maximum profit earned is P*abc. The value added by the retailer, defined as the difference between the price and the bought-in materials, is P*-ABC, and is conventionally subject to VAT.

We now move on to the case of the larger retailer (supermarket or discount store) which is able to negotiate better terms with the supplying manufacturer. By buying in bulk retailers are able to obtain 'quantity discounts' on large orders. This may take several forms, but for simplicity we assume that there is a continuous linear relationship – i.e. cost falls uniformly as the order quantity is increased. As a result, the Average Buying Cost (ABC) is a downward sloping straight line with the associated Marginal Buying Cost (MBC) also linear and lying below it. This is shown in Fig 2 below. The marginal cost of the extra unit bought is the cost of that unit less the reduced cost on all previous units. The fixed costs of the larger retailer will cover the same sort of items as described earlier, but will naturally be larger due to the bigger scale. The Average Fixed Selling Cost curve will, as before, be a rectangular hyperbola. Average Variable Selling Costs will cover the same items as before, and the shape of this curve is likely to be the similar – fairly constant up to capacity and then rising sharply.

The combined selling and buying cost curves, in average form (ATC) and marginal form (MC) will take on a different shape to Fig 1. This is because ATC is continually pulled down by the quantity discounts until the rise in AVSC at capacity more than overcomes it. This is shown in Fig 2 below. The scale of the Q axis is greater than in Fig 1 since the volume of sales of the large retailer is much larger.

Figure 2: High street trader – quantity discounts



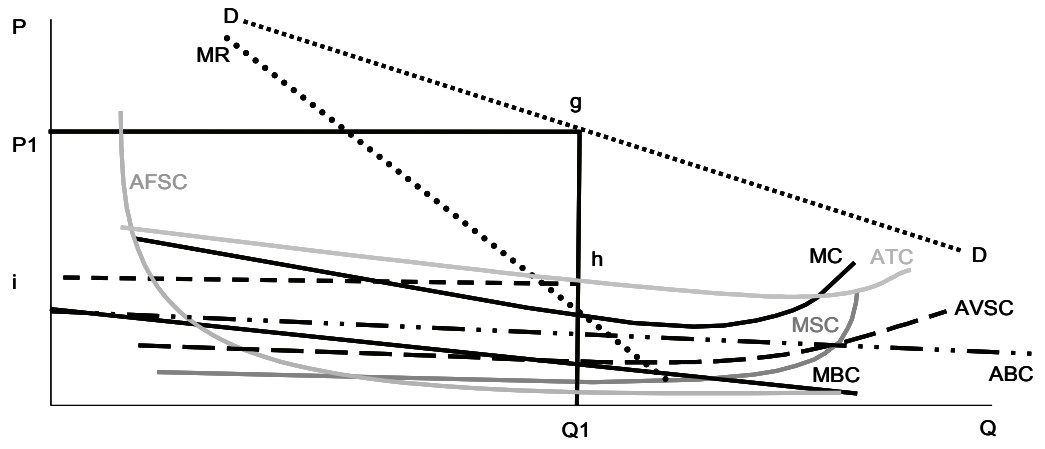
The demand curve DD and marginal revenue curve MR are shown as downward sloping for the same reasons as described before. To maximise profits the retailer will set at price of P** and sell a volume of Q** under

the operation of the conventional marginal rules, to earn a profit of P**def. The price charged by this large retailer is lower, the volume sold is higher and the profit earned larger than the small retailer in Fig 1. This is the result of the quantity discounts in reducing the buying costs of the retailer, together with the economies of scale in operation of larger retail units.

We now turn to the case of the on-line retailer. Here the situation is very different. Orders are taken via the internet and so there is no direct contact with the customer in terms of purchasing the goods. The customer is able to view the goods on-line, and then go on to make a selection, complete an order form, arrange delivery and pay for the goods simply by following instructions on the screen. On-line firms are often located at a single base for the whole country, and have no need to be near a centre of population. Indeed business rates and rents will typically be much lower in more remote locations. Of critical importance is the nearness to good transport facilities, both for the inward movement of goods and the delivery to customers through its own distribution system.

The nature of costs will be radically different to conventional retailers. There is no need for the labour employed in conventional retail outlets; indeed, a telephone help line may be all that is required to handle customer enquiries. Labour costs are likely to be low since most of the transaction processes are highly automated. Capital costs are, however, likely to be high including the warehouse construction costs, automated stock system (both in and out), IT hardware and software systems, and a fleet of vehicles for delivery.

Figure 3: Quantity discounts and lower selling costs

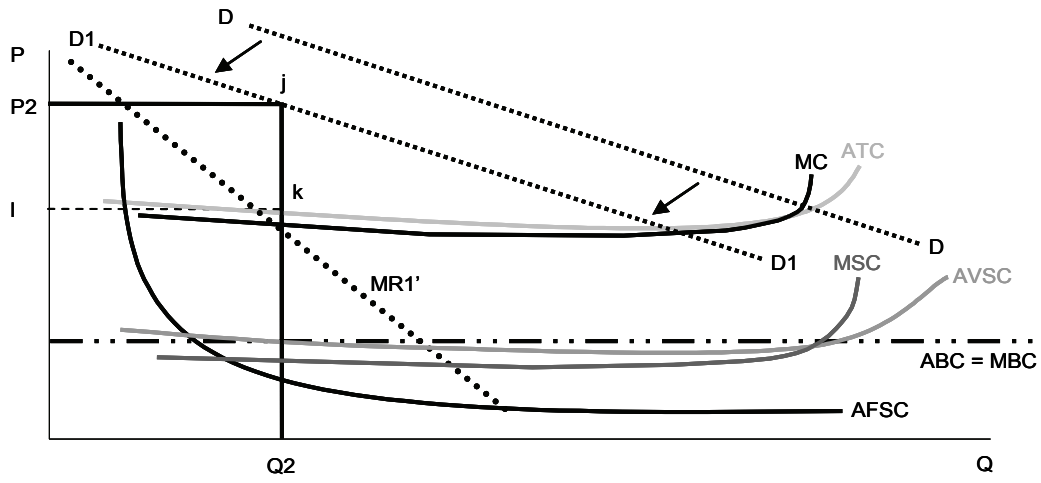


As a result of these differences, Average Variable Selling Costs will tend to be much lower than for conventional firms, due to reduced labour costs. Fixed costs follow the same path as before but here the high costs are spread over a huge volume of sales. Because of the high volume of sales, quantity discounts are likely to be much greater than for conventional retailers, so reducing the buying cost of stock. The overall situation is shown in Fig 3 above.

The maximum profit is obtained by charging a price of P1 with a sales volume of Q1, using the conventional marginal rules, earning a profit of P1ghi. The price is lower and the quantity higher than in Fig 2, due to the much lower cost base of the on-line retailer, coupled with strong bargaining power in negotiating big quantity discounts from the manufacturer. The on-line retailer is typically selling into a national market rather than a local/regional one. As a result the quantities on the horizontal axis in Fig 3 are far greater than those in Fig 1 and Fig 2.

These three retailers have so far been analysed separately, but in reality, they react with one another. In particular, the low price of the on-line seller will be stiff competition for the local suppliers. Some customers will switch from local to on-line suppliers based on this lower price – depending on the sensitivity of demand to price for the particular product. The impact on the small retailer can be dramatic as it effectively loses some of its local monopoly. The demand curve for the product moves inwards from D to D1 in Fig 4 below.

Figure 4: High street trader – facing price competition from internet trader



The associated marginal revenue curve also moves inwards to MR1 thus altering the equilibrium point for the retailer, leading to reduced sales of Q2 and lower profits of P2jkl. This process will continue, first reducing profits, then leading to losses and finally forcing the retailer out of business.

Exactly the same analysis can be applied to competition between the on-line firm and the high street trader able to get quantity discounts. Here the price differential is not as wide as for the small retailer, but the high street retailer still loses some of its local monopoly to on-line retailers, leading to reduced sales and profits. In time reduced profits may turn to losses for some stores, eventually forcing them to close. The result is that the retailing sector becomes more concentrated, with fewer firms in the market, and greater dominance by the larger firms.

We noted earlier that prices quoted by retailers are often shown as a discount on the RRP. How do we integrate such discounting into our analysis of retail prices? Instead of quoting the price as P* in Fig 1, the retailer would advertise the price to consumers as the RRP less a discount, which would end up with exactly the same price of P*. This of course assumes that the demand at P* is the same as the RRP less the discount – as it would be under conditions of consumer rationality. For example, we would expect demand at an advertised price of say £100 to be the same as a RRP of £200 less a discount of 50%. Evidence suggests, however, that consumers may not be so rational and many are persuaded by apparent 'bargain discounts' and 'special offers'. If so, the discounting of a fictitiously high RRP to show apparent large 'savings' may be regarded as a clever marketing ploy. Its prevalence in retailing on so many goods right through the year suggests that this may well be so. In terms of our diagram the effect is simply to move the demand curve to the right, as consumers (irrationally) demand more due to higher apparent discounts on RRP.

Over time these discounts appear to have risen. In the period immediately following abolition of RPM, average discounts from RRP were typically in the 15-25% range (Blois et alia, 1975), while Pickering (1966) observed that RRPs were gradually being inflated. This process seems to have continued over subsequent decades with discounts of 50% now commonplace and reductions of up to 75% sometimes quoted. For retailers to still make a profit, this must imply a RRP being put artificially high by manufacturers in order to allow retailers to advertise huge discounts to customers.

4. Conclusion

In section 3 we have demonstrated that it is possible to adapt the traditional marginal theory of the firm to explain how prices are set in the retailing sector. Although the models are somewhat more complicated than for the traditional theory of the firm, they can be used to predict optimum price, sales, profit and value added. They also demonstrate the theoretical process by which on-line businesses are providing stiff competition for high street discount stores, out-of-town supermarkets, and smaller businesses.

The position of the small independent retailer is threatened by the high costs of running a retail unit on the high street, by the inability to qualify for quantity discounts from suppliers and by price competition from large discount stores and on-line retailers. It is therefore no surprise that increasing numbers of small retailers are going out of business. For example, since the introduction of open price competition in the market for books, by the abolition of the Net Book Agreement in 1997, the number of bookshops in Britain has fallen from about 4,000 in 2005 to only 2,178 in July 2011, with 580 towns having no bookshop at all (Experian, 2011). Where independent shops remain, they usually have a loyal customer base built up over many years, a specialised range of goods, and a back-up of excellent customer service

Since the abolition of RPM in the 1960s the discount stores on the high street have gradually gained market share as many of the independent stores declined, failed or were taken over. Their ability to negotiate high quantity discounts has been crucial to offering bargain prices to the public, but this is often disguised by inflated RRPs quoted by manufacturers. The scale of quantity discounts have also come under fire, especially from small independent retailers who complain that discount stores can sometimes sell goods at a lower price to the public than they are able to buy them from suppliers. This may be because some large retailers use their monopsonistic buying power to extract very low prices from suppliers. For example, supermarkets in particular have been criticised in the way in which they have allegedly forced down the price of some food items, while expecting suppliers to pay for part of the advertising of special offers in stores.

However, the supremacy of the discount stores is itself under threat from on-line suppliers who are able to under-cut on prices due to their lower cost base and huge quantity discounts on large orders. This has led some

discount stores to fail while others have launched their own on-line sales operations to try and match the competition.

As with any technological advance, the growth of on-line retailing has brought both benefits and costs. On the positive side the ability to see and compare products on screen, choose the right product, buy at a very competitive price, pay for it on-line and then have it delivered to one's door in a matter of days, is undoubtedly of great benefit to many. On the negative side the disappearance of small local shops with a wide range of specialist products, where one could see the product before buying, take the advice and experience of a specialist retailer, and have confidence in after-sales service, is a cause of regret to others.

We have concentrated in this paper on the impact of the internet on the prices of goods. However, a similar effect is taking place in the purchase of many services. For example, the lowest energy tariffs, the cheapest travel tickets and holidays, the best insurance rates, the lowest borrowing costs and the best savings rates are usually only available on-line.

In a wider context, the physical nature of our towns and cities as shopping centres is radically changing. There are fewer independent shops narrowing the range of goods available. In their place are the 'convenience stores' of the major supermarkets alongside a range of small scale services such as restaurants, cafes, hairdressers and beauty salons. The on-line competition in other services means a high street with no gas or electricity showrooms, fewer travel agents, insurance offices, bank branches and post offices. For those individuals unwilling or unable to make purchases on-line, the depressing prospect is one of greater difficulty in finding and purchasing the goods and services they need, while being forced into paying higher prices than those using the internet. The hardest hit will be those who cannot afford to buy a computer and pay for a broadband connection, those who cannot get a bank account, and those who are unable or unwilling to learn how to use modern technology.

Belatedly the Government has recognised the problems of the death of many businesses on the high street, with a loss of about 30 nationally every day. Many historic towns now have large numbers of vacant properties, many charity shops, but few of the varied businesses that once used to exist. Following a report by the retail analyst Mary Portas, the Government has set aside limited funds for collaborative efforts of businesses to regenerate their towns. Some hope may also come from

combining an on-line ordering and delivery service with local retailer outlets – as in the case of the company Hubbub founded by Marisa Leaf. This has had some success in parts of London, and there are plans to extend the scheme nationally. While these schemes may have limited success, they seem unlikely to counter the overwhelming competitive power of large superstores and on-line businesses in driving out smaller independent retailers.

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