

Demand and Price Dynamics in Pharmaceutical Markets: Some International Comparisons

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1. Introduction

Over the past ten years most advanced economies have experienced strong growth in expenditure on pharmaceuticals both in absolute terms and as a percentage of GDP. The reasons put forward for this surge in spending on drugs include the ageing of the population, the increase in the price of new drugs, the development of newer more effective drugs for previously untreatable conditions, the muted nature of price signals for the consumer of drugs and inappropriate prescribing of expensive drugs by doctors.

In most countries the government is an active participant in the market for pharmaceuticals. Even if it is not the dominant (or sole) purchaser of drugs, such as in Australia, New Zealand and Sweden, it is usually responsible for providing subsidised drugs to groups within the population, such as the elderly. Where the government is not a dominant force, its role is taken by various intermediaries such as the Pharmacy Benefit Managers in the USA.

Faced with rapidly increasing payments for pharmaceuticals, Governments and insurers have sought ways to reduce these costs, while still ensuring that the population has adequate access to medicines.

Several means have been adopted to reduce costs, including restrictions on the type and numbers of drugs that qualify for support, reductions in subsidy levels, regulation of prices, and the encouragement of the use of cheaper generic equivalents to more expensive branded drugs.

Australia is a good example of a country where the price of drugs is heavily influenced by Government's role as an effective monopsonist purchaser, and the prices of a significant group of drugs are determined by the reference to the cheapest supplier. A companion report¹ in the CSES series on pharmaceuticals and health care in Australia has shown that, despite this active government intervention, there is still significant competition among suppliers of the same chemical entity and this extends to competition between different therapeutic approaches to treating a disease and among related drugs within the same therapeutic class. While this competition is not expressed to any extent in price differences, it does occur around market share. Suppliers adopt a range of different market strategies to differentiate their products, for instance, through the introduction of new combinations of drugs, and new formulations and packet sizes.

The USA, on the other hand is often cited as a country with a much freer market for pharmaceuticals where companies differ markedly in their pricing strategies.²

While the operations of the Pharmaceutical Benefits Scheme (PBS) in Australia might be expected to lead to lower prices for pharmaceuticals in general, this may not be the case at all stages of a drug's lifecycle, particularly when competition from generic

¹ Sweeny, K, "Demand and Price Dynamics within the Pharmaceutical Benefits Scheme", Working Paper No. 6, Pharmaceutical Industry Project, CSES, June 2002.

² Lu, J and Comanor, W, "Strategic Pricing of New Pharmaceuticals", Review of Economics and Statistics, Feb 1998, vol 80, no 1, pp 108-111.

drugs emerges. The Productivity Commission has compared the prices in Australia of a range of popular drugs with prices in a number of other countries.³

It found that when comparing Australia to a range of other OECD countries:

- the prices of new innovative drugs in Australia are broadly similar to other countries, except for the USA;
- the prices of “me-too” drugs in Australia are the lowest among the comparison countries; and
- the prices of generic drugs in Australia are among the lowest of all countries.

This study takes up the case studies examined in the CSES report mentioned above, and extends the analysis to the countries included within the Productivity Commission’s comparison group, namely Canada, France, New Zealand, Spain, Sweden, United Kingdom and the United States of America. Demand and price dynamics are illustrated for the following popular drugs:

Treatments for Peptic Ulcers

H2-receptor antagonist

Ranitidine

Proton Pump Inhibitor

Omeprazole

Antidepressants

Selective Serotonin Reuptake Inhibitors

Fluoxetine

Cholesterol Reducers

HMG CoA reductase inhibitors – the “Statins”

The period covered by the analysis in this paper is 1990-91 to 2000-01. During this time, ranitidine and fluoxetine both came out of patent in most of the comparison countries. The impact of competition from suppliers of generic equivalent drugs is examined in some detail.

The data used in this study is based on that collected by IMS Health, typically through surveys of manufacturers and wholesalers in each country. The database used includes information on sales and prices for the different strengths, formulations and packet sizes for each drug sold by each manufacturer. Volume data has been obtained by dividing sales by price. Prices are manufacturer selling price or wholesaler purchase price and sales are on the same basis.⁴

³ Productivity Commission, “International Pharmaceutical Price Differences”, Research Report, July 2001.

⁴ The author would like to thank Alison Welsh for her assistance in preparing and analysing the data.

2. Pharmaceutical Systems in Comparison Countries⁵

In **Australia** about 80% of drugs sales occur through the Pharmaceutical Benefits Scheme which subsidises the cost of prescription drugs to the patient. Sales of drugs not listed under the PBS do not receive a subsidy. The PBS negotiates the price and other conditions of listing with manufacturers and increasingly is using therapeutic reference pricing to reduce the prices of drugs. The PBS encourages the use of generics although the difference in price between the original drug and generic substitutes is not large.

Although **Canada** has a universal health system it does not include pharmaceuticals. However all provinces subsidise drugs to some extent, at least for some groups. About two thirds of pharmaceutical spending is from the private sector - insurance companies, employers, individuals – and they are looking at ways such as restrictive formularies, and greater use of generics to contain costs. Manufacturer's prices are regulated through the Patented Medicine Pricing Review Board.

All residents of **France** are covered by public health insurance which includes drugs. Patients are responsible for a copayment, usually around 35%. Prices are negotiated with suppliers and more lately expenditure limit agreements have been signed which impose higher taxes on companies if they exceed the limit.

New Zealand has a system similar to that in Australia. The Pharmaceutical Management Agency was established in 1993 makes decisions on listing and prices using reference pricing. It also has risk sharing agreements about expenditure with suppliers.

In **Spain** the National Health System provides universal access to drugs under which patients pay a small copayment. It fixes the price of medications and decides on which drugs will be included and excluded. Reference pricing was introduced in 1997 and generic drugs are encouraged. In 1995 a ceiling was put on drug expenditure growth and profit reductions negotiated with companies.

In **Sweden** drugs are part of the national social insurance scheme. All pharmacies are state owned through the National Corporation of Swedish Pharmacies. Patient copayments are determined on a sliding scale according to the price of the drug. The Drug Affairs Division within the National Social Insurance Board sets reimbursement prices for drugs covered by the Drug Benefit Scheme. In 1993 a reference price systems was introduced for drugs out of patent.

A restricted list of drugs is made available in the **United Kingdom** through the National Health Service. In recent times the establishment of the National Institute for Clinical excellence has signaled a more rigorous approach to deciding which drugs to include on the list. The Pharmaceutical Price Regulation Scheme regulates the profits

⁵ Information for this section was drawn from Jacobzone, S, Pharmaceutical Policies in OECD Countries: Reconciling Social and Industrial Goals, OECD, April 2000 and various studies by the European Observatory on Health Care Systems in their Health Care Systems in Transition series, including studies of Canada, New Zealand, Spain, Sweden and UK. A report in April 2002 by the Observatory for the UK Treasury entitled "Health care systems in eight countries: Trends and challenges" covers Australia, France, New Zealand, Sweden and UK among others.

made by pharmaceutical companies through their sales to the NHS. About 14% of prescriptions attract a copayment.

The **United States** has a variety of schemes governing pharmaceuticals. Most pharmaceuticals are provided either directly to patients or through Pharmacy Benefit Managers or the like, which provide insurance against drug costs. Some States are considering schemes more like those in Europe or Australia.

3. Treatments of Peptic Ulcers

3.1 Overview

Peptic ulcers are a common problem in most countries and drugs to treat them figure prominently among the top selling medicines. In Australia, for instance the two leading treatments – omeprazole and ranitidine – are among the top 8 selling drugs within the PBS.

Drugs for treating peptic ulcers were relatively ineffective until the development of the H₂-receptor antagonists, the first of which, ranitidine, was released by Glaxo in Australia in 1982. This was followed by cimetidine in 1983, famotidine in 1989 and nizatidine in 1993.

More powerful type of drugs, the proton pump inhibitors, were developed somewhat later, with omeprazole being launched in 1990, to be followed by lansoprazole in 1994 and pantoprazole in 1995.

Therapies which combine these drugs with antibiotics have also appeared over the past few years.

The H₂-receptor antagonists were originally dominant in the market for treatment of peptic ulcers, but have been displaced by the proton pump inhibitors in all the countries within this study. For Australia, Canada, Spain, UK and USA the proton pump inhibitors outsold the H₂-receptor antagonists since 1995-96 or 1996-97. For France and Sweden this occurred somewhat earlier and for New Zealand a few years later.

Ranitidine has been the most popular form of the H₂-receptor antagonists, followed by famotidine then cimetidine. In the UK however, cimetidine has been more popular than famotidine, while in recent years in the USA, famotidine has been outselling ranitidine.

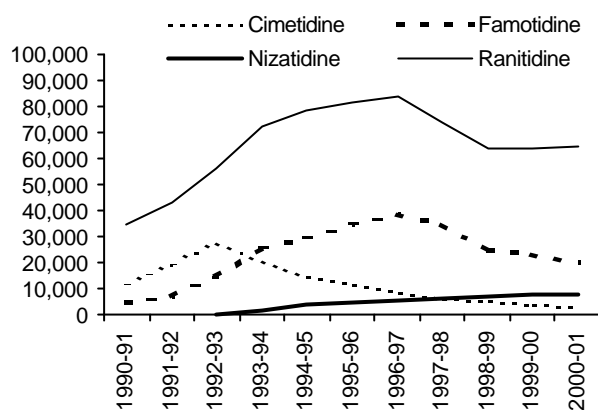
Similarly, omeprazole has been the most successful of the proton pump inhibitors in each country, usually followed by lansoprazole, with about 25% of the sales of omeprazole. In New Zealand, pantoprazole is the second proton pump inhibitor, while in the UK and the USA, lansoprazole's sales are much close to those of omeprazole.

The Australian experience with both drugs has been reasonably typical (graphs on following page).

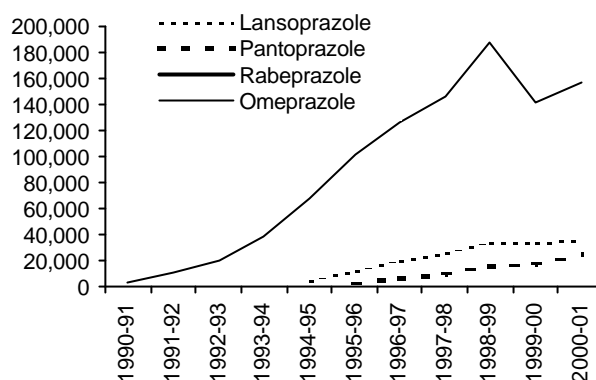
The commonality of experience across countries strongly suggests that superior efficacy in treating the disease is the principal cause for the success of ranitidine among the H₂-receptor antagonists, then their displacement by the proton pump inhibitors, and omeprazole's dominance among the this latter group of drugs. However the differences in their sales and volume profiles over the period for these drugs may be due to their relative prices and to other factors such as the relative marketing efforts devoted to each drug in each country. There may also have been an advantage for ranitidine and omeprazole in being first to market.

During the 1990s, ranitidine came out of patent in all the comparison countries and alternative suppliers entered the market in competition with Glaxo. For Canada, France, and Spain, however alternative suppliers appeared well before patent expiry, perhaps indicating that co-licensing arrangements had been made within those countries.

Australia H2-Receptor Antagonists Sales



Australia Proton Pump Inhibitors Sales



For omeprazole, patent expiries began in the second half of the 1990s, and for Canada, New Zealand, UK and USA there were no competitors for AstraZeneca during the period. Table 1 shows when competition emerged in each country for these drugs and the number of suppliers in the market during 2000-01.

Table 1 Markets for Ranitidine and Omeprazole, 2000-01

	RANITIDINE		OMEPRAZOLE	
	Competitor enters	No. Suppliers	Competitor enters	No. Suppliers
Australia	1996-97	10	1997-98	2
Canada	before 1990-91	14	None	1
France	before 1990-91	14	1991-92	2
NZ	1993-94	5	None	1
Spain	before 1990-91	28	before 1990-91	31
Sweden	1994-95	13	1996-97	9
UK	1996-97	13	None	1
USA	1997-98	19	None	1

3.2 Ranitidine

Ranitidine provides a good example of what happens when a company's patent on a drug expires and other suppliers of the same chemical entity enter the market.

As noted in the report of Australian experience,⁶ when a new drug enters the market, it is typically protected by a patent with a lifetime of 20 years. This patent is usually granted at a relatively early stage of a drug's development and well before it is

⁶ Sweeny, K, op cit.

actually available to be sold. The patent enables the developer of the drug to recoup the substantial R&D and other costs involved in bringing a drug to market, by giving it monopoly rights to supply the drug. These monopoly rights usually cover about 10 years in the market and enable the supplier to charge substantially more than the unit cost of manufacture which is a relatively small percentage of cost for most drugs.

This low cost of manufacture means that when drugs are no longer covered by patent, other suppliers are willing to start manufacture of the identical chemical and enter the market as competitors to the original monopoly supplier. As the cost of manufacture and other barriers to entry are relatively low, the introduction of new suppliers can lead to rapid and significant reductions of price.

The original supplier of the drug often reacts to this new competition by introducing new strengths and formulations of the drug which make it easier or more convenient for the consumer. Doubling the strength for instance, means taking one tablet a day rather than two per day. Another common tactic is to increase the number of doses per pack, e.g. from 30 to 60. In Australia for instance, there were over 10 distinct variations of ranitidine available on the market in 2000-01. In Canada there were over 20.

This introduction of new variants complicates the process of tracking the price of ranitidine over time and of making comparisons among different countries.

The procedure adopted here was to standardize on the most popular form of ranitidine in Australia – a packet of 60 tablets each with 150mg of the active ingredient. In France the nearest equivalent was a pack size of 30 tablets. In Spain the original nearest pack size was 20 tablets but this was displaced by a pack size of 28 tablets during the period. The data for these countries was adjusted to be equivalent to the other countries.

Sales and price data were collected from each country for all suppliers of the 150mg/60 pack or equivalents. Volume data was calculated by dividing sales by price. The Glaxo brand was then compared both to an average of all the other suppliers in the market and to individual main competitors.

Graphs showing the movement over time of volume, sales and prices in unadjusted local currency units are given in Appendix One.

In France, the two major suppliers – Glaxo and Fournier – have very similar experiences having shared the market in broadly similar proportions and with virtually identical prices. The appearance of generic suppliers has had little impact to date despite offering significantly lower prices.

In Spain also Glaxo has remained dominant despite a host of other suppliers, possibly because it has tended to follow the lead of the generics in offering lower prices, although not as aggressively.

In Australia and New Zealand, the major generic has significantly challenged Glaxo for market leadership. Prices have fallen much further and faster in New Zealand than

Australia although in both countries there is very little difference in price between Glaxo and the generic.

To a certain extent this has been repeated in the UK, where generics have overtaken Glaxo although Glaxo has maintained a significant price premium over the generics, particularly in recent years. This price premium has meant that it is still the market leader when measured in sales rather than volume.

In Sweden also the presence of a price premium over the generics has enabled Glaxo to defend its share of a very reduced market. Glaxo's price has fallen however with the advent of competition.

Canada and the USA differ significantly from the other countries in the comparison group. Here Glaxo maintains a price which is much higher than that of the generics and is prepared to sacrifice market share in doing so. The result however is that its revenue is maintained at a higher rate than it would otherwise be. There is also a considerable spread among the prices offered by generics although they all fallen markedly over time.

Of the comparison countries, both Australia and New Zealand experienced falling prices both before and after the introduction of competition. All the other countries had static or increasing prices prior to competition from generics.

The graphs in Appendix One have demonstrated the experience in each individual country. To compare experiences directly, the price of Glaxo and the average price of all the other suppliers in the market in local currency units were converted to US dollars at appropriate exchange rates for each year. A second version of these prices was created by multiplying the prices in local currency units in each year by the US dollar exchange rate for 2000-01. This latter technique removes the effect of exchange rate movements on relative prices, which has been significant over recent years with the general appreciation of the US dollar.

The first two graphs on the following page show the Glaxo price and the average price of all other suppliers in US dollars. The second two graphs show the same adjusted with the average US dollar rate for the period 1990-01 to 2000-01.

The **Glaxo price** in the USA starts at a higher level (US\$66) than all the other countries and increases across the period to US\$86. The Canadian Glaxo price starts at a lower level (US\$36) and increases slightly from there.

The UK, Sweden and Spain show similar profiles in that the price is virtually unchanged until generic competition arrives although each country starts from somewhat different prices.

Australia and New Zealand have the lowest starting prices and show continuous decline during the period, so that their finishing prices are also the lowest.

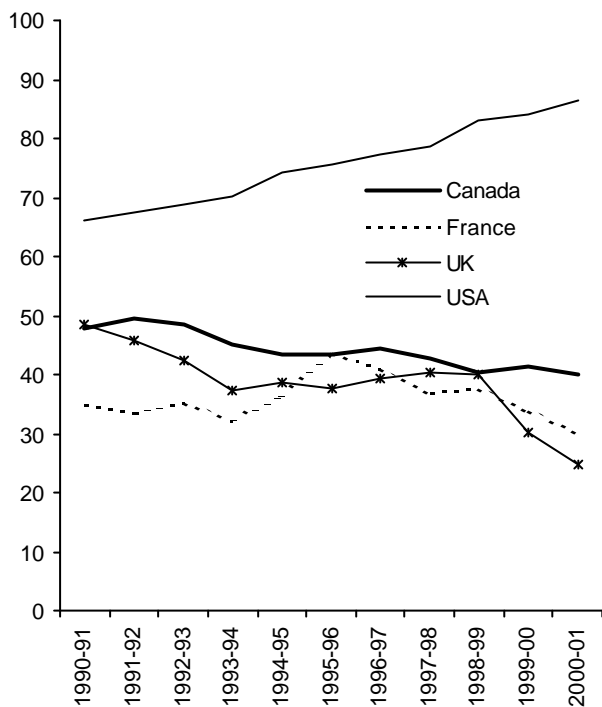
France also had a low initial price – about the same level as Spain – but the price remained constant except for a one-off increase.

The **average generic prices** show a somewhat different pattern.

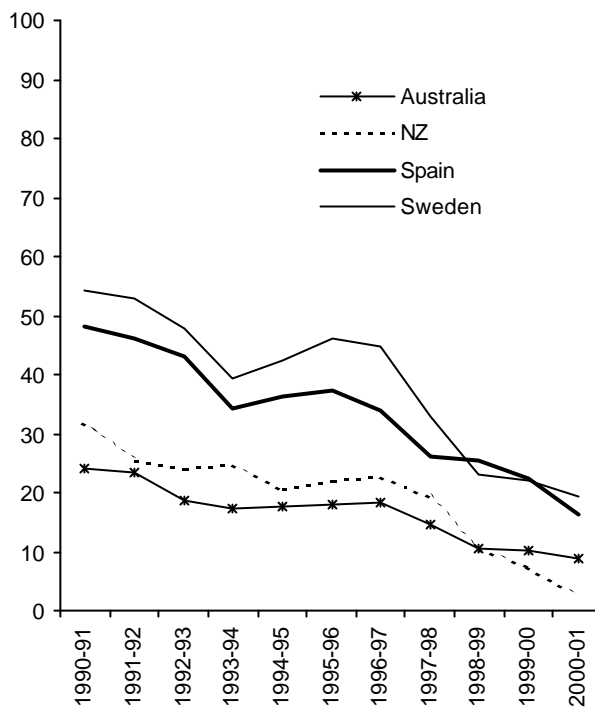
France, Spain, Sweden have similar starting prices (around US\$25) and show only mild decline from there. The UK and USA start at about US\$30 and fall steeply thereafter, while Canada also falls sharply although from a somewhat lower initial price.

Again Australian and New Zealand have the lowest initial prices, but for Australia the fall in price is relatively mild.

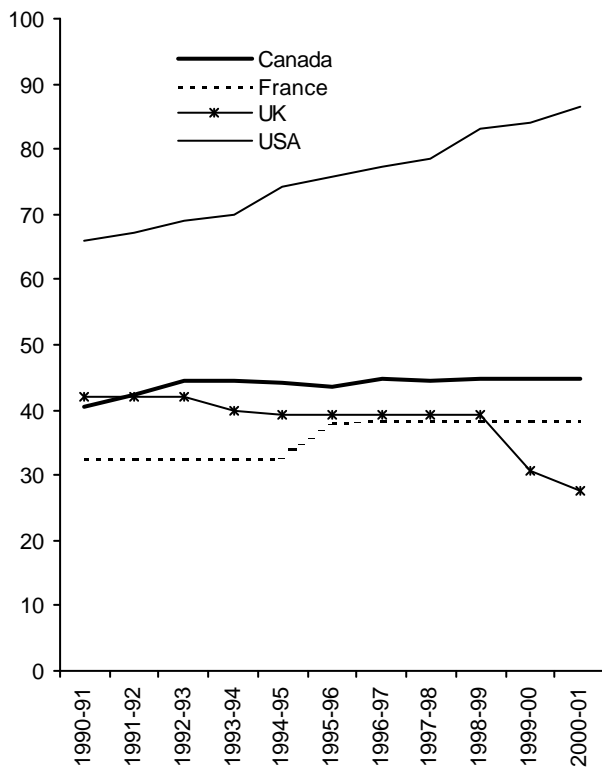
**Ranitidine 150mg/60
Glaxo Prices USD**



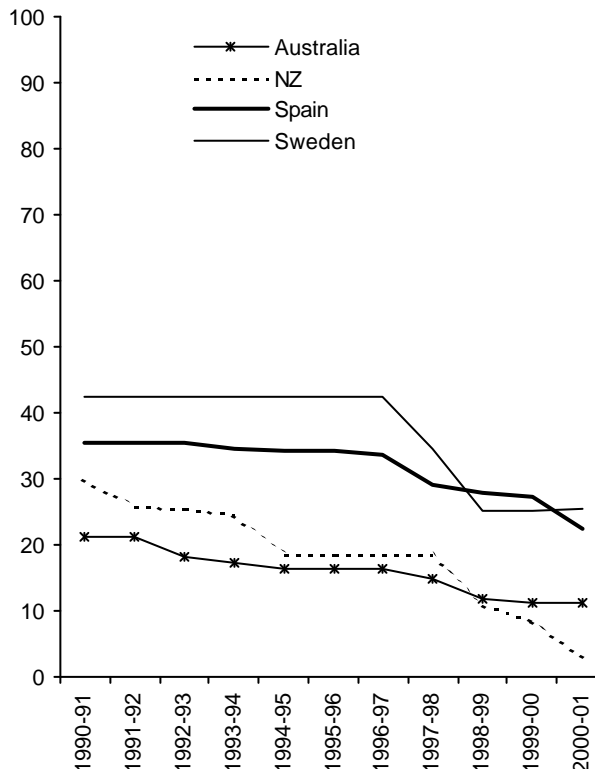
**Ranitidine 150mg/60
Glaxo Prices USD**



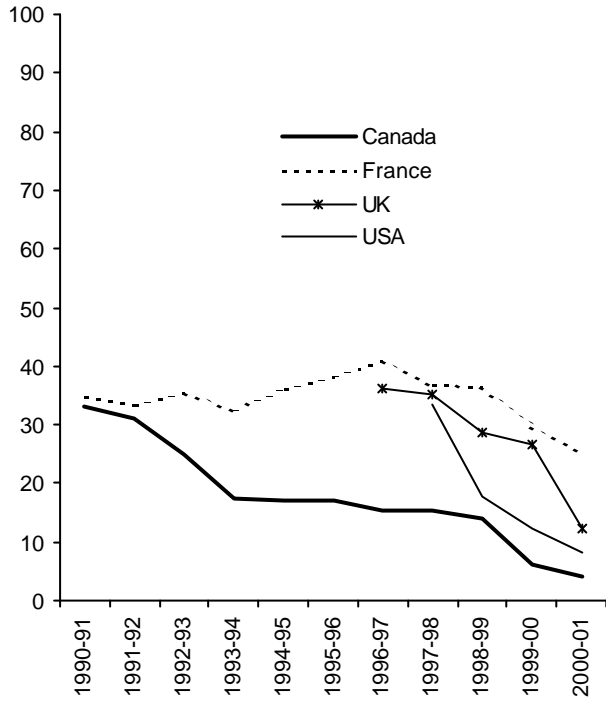
**Ranitidine 150mg/60
Glaxo Prices LCD**



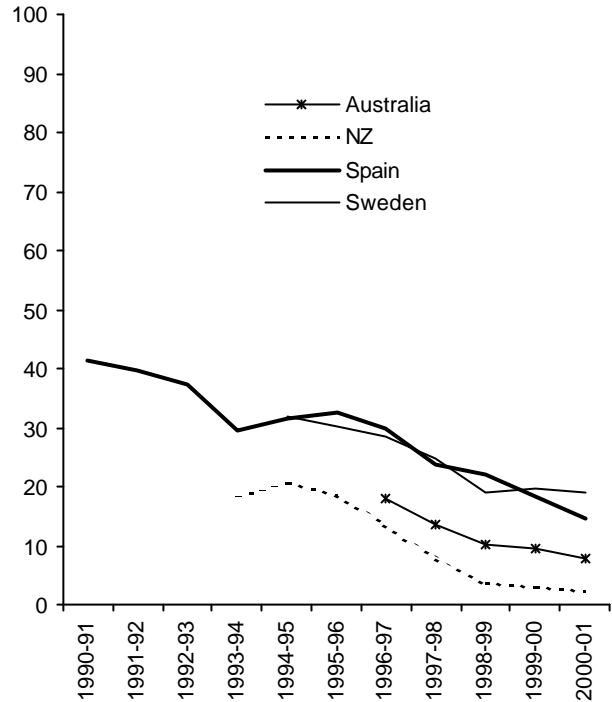
**Ranitidine 150mg/60
Glaxo Prices LCD**



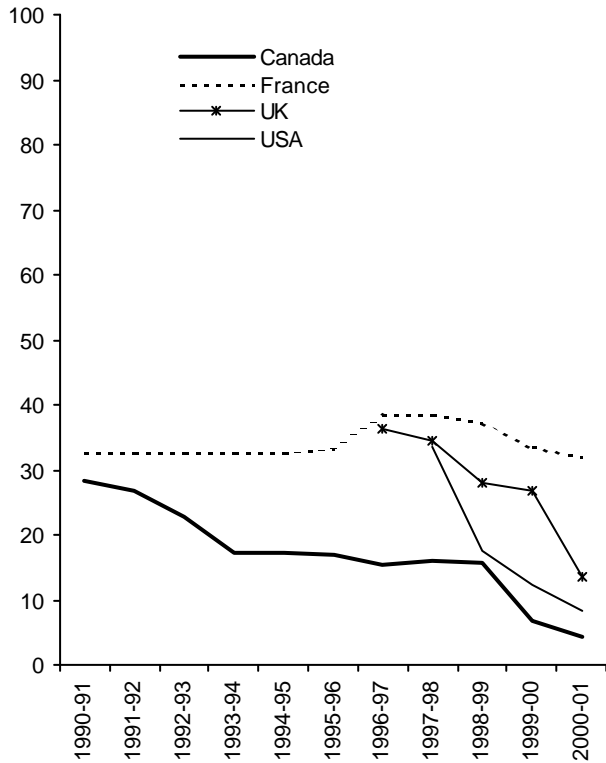
Ranitidine 150mg/60
Average Non-Glaxo Prices USD



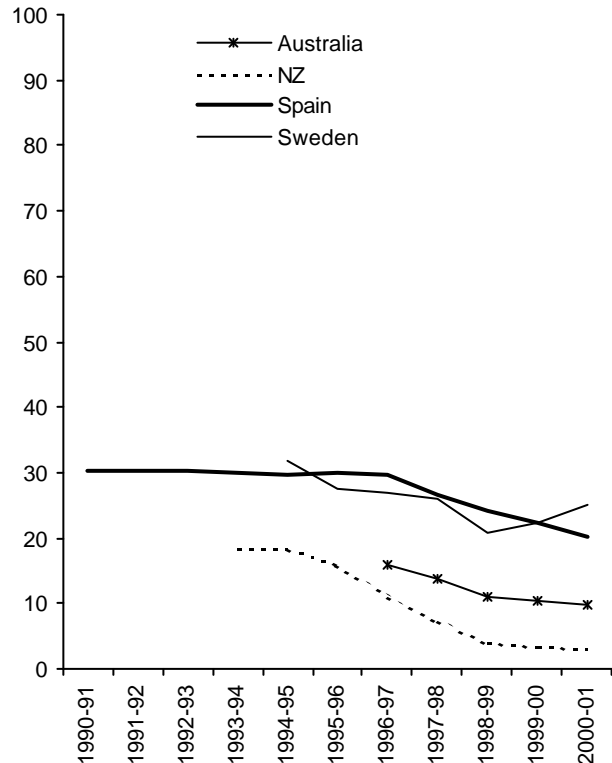
Ranitidine 150mg/60
Average Non-Glaxo Prices USD



Ranitidine 150mg/60
Non-Glaxo Prices LCD



Ranitidine 150mg/60
Non-Glaxo Prices LCD



4. Antidepressants

4.1 Overview

Depression, along with other diseases of the nervous system, is a major contributor to morbidity in most advanced economies. It is the fourth most prevalent disease in Australia⁷ and is growing strongly.

The most effective drugs to treat depression in recent times have been the selective serotonin reuptake inhibitors (SSRI), which includes citalopram, fluoxetine, fluvoxamine, paroxetine, and sertraline. These have been joined more recently by a newer type of drug, venlafaxine.⁸

In Australia, fluoxetine was introduced by Lilly in 1990. This was followed by paroxetine and sertraline in 1994, venlafaxine in 1996 and citalopram in 1998.

Graphs showing the relative importance of the various type of antidepressants in each country are shown on the following pages.

In Australia, Canada, and New Zealand, the original SSRI – fluoxetine – was displaced by paroxetine and/or sertraline.

In France and the USA fluoxetine is still the market leader, while in Spain and UK it relinquished this lead only recently.

Sweden provides a distinctively different story, with fluoxetine having a late and modest appearance, while the dominant drug has been citalopram, which is a much less popular drug in the other countries.

In most countries the challenge to fluoxetine came from paroxetine and sertraline. In Australia and Sweden sertraline has done better than paroxetine, while in Canada, France, Spain, New Zealand and UK paroxetine has come out on top. In the USA their market shares are very similar.

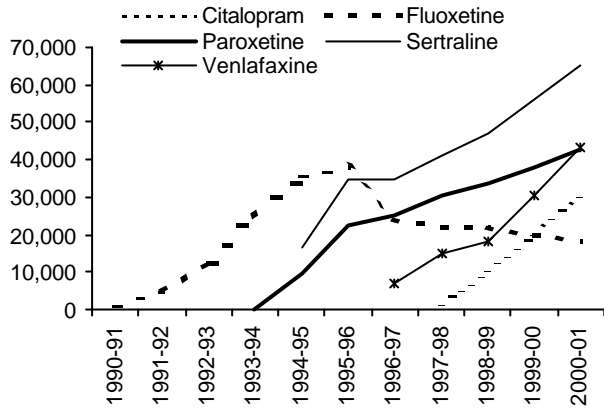
Venlafaxine appeared later than the most of the other antidepressants and has done well in Australian and Canada. With the exception of Sweden, citalopram is generally the least popular antidepressant.

The experience with antidepressant drugs is therefore quite different to that of drugs used to treat peptic ulcers. In the latter case, ranitidine was the original H₂-receptor antagonist and remained the dominant drug. The original SSRI, fluoxetine has been successfully challenged in a number of markets but the challenger has differed from country to country.

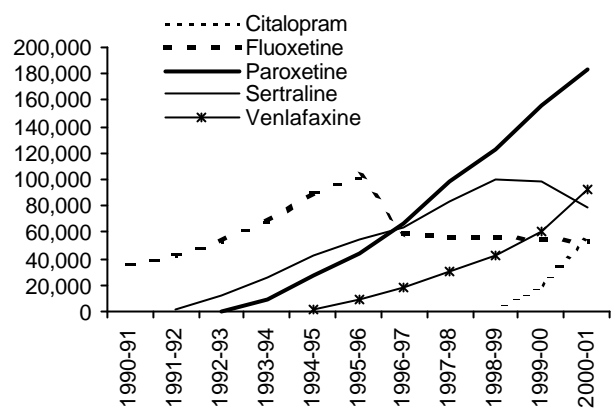
⁷ Mathers C, Vos T, Stevenson C, “The burden of disease and injury in Australia”, Australian Institute of Health and Welfare, Canberra, November 1999.

⁸ A further drug, moclobemide, which was significant in Australia until recently, is unimportant in the other comparison countries.

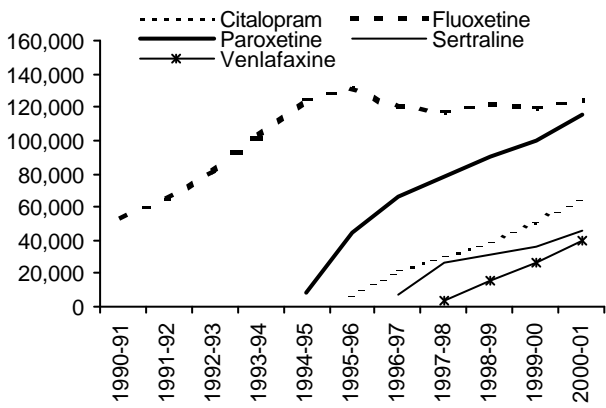
Australia Antidepressants Sales



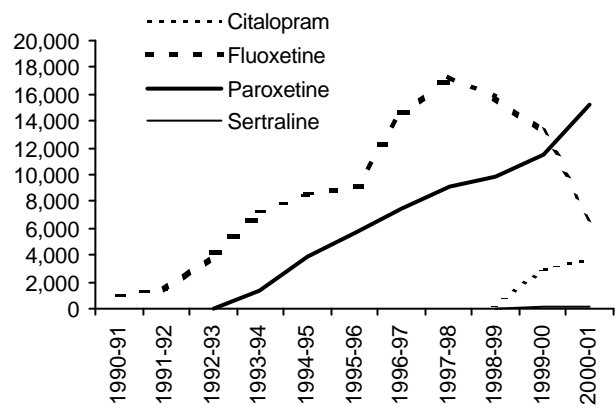
Canada Antidepressants Sales



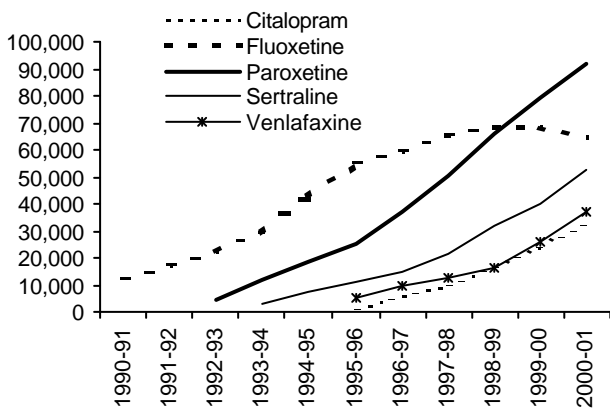
France Antidepressants Sales



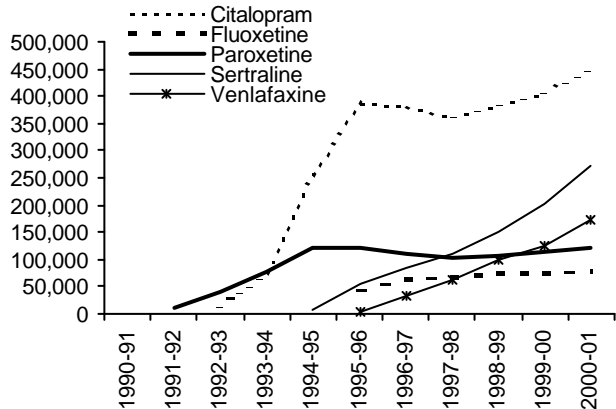
NZ Antidepressants Sales

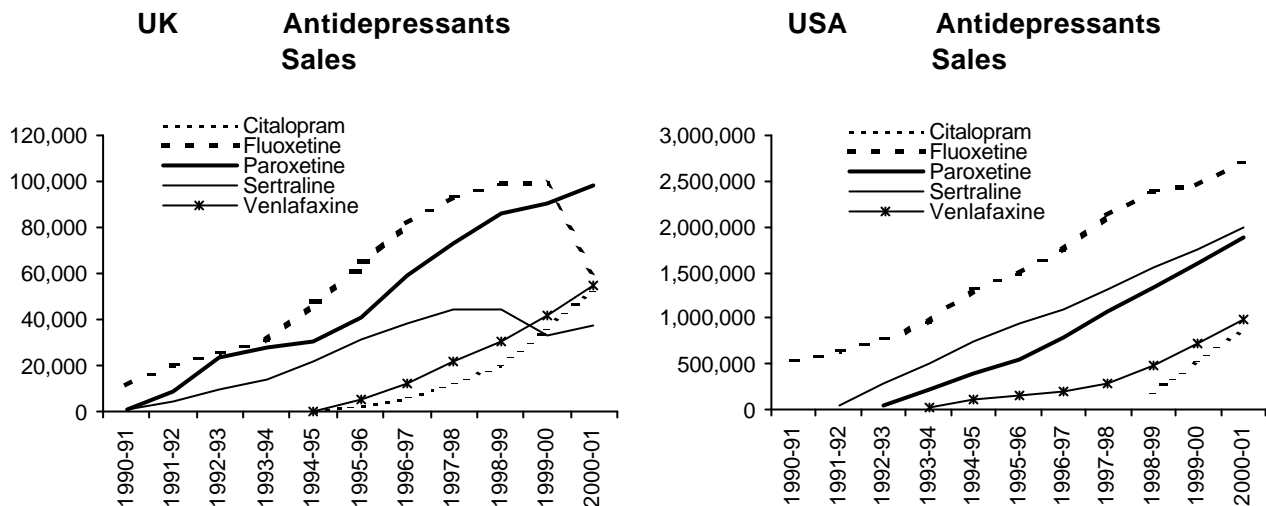


Spain Antidepressants Sales



Sweden Antidepressants Sales





4.2 Fluoxetine

Fluoxetine was the original SSRI among the antidepressants and generally speaking it has been the first to go off patent and face competition from generics.

Among the comparison countries this has occurred at different times (Table 2), and within the time period of this study had yet to happen in France and the USA. In the latter case, the patent expired in the second half of 2001.

Table 2 Markets for Fluoxetine, 2000-01

	Competitor enters	No. Suppliers
Australia	1995-96	11
Canada	1995-96	11
France	None	1
NZ	1999-00	3
Spain	Before 1990-91	25
Sweden	1996-97	7
UK	1999-00	10
USA	None	1

To undertake a comparison of the market for fluoxetine, data was collected in a way similar to that used in the ranitidine case study described in Section 3.2.

Graphs showing volume, price and sales in unadjusted local currency units for the nearest equivalent of a pack of 28 20mg tablets of fluoxetine are given in the Appendix.

In France despite the inroads from the other SSRIs, the price of fluoxetine has remained virtually unchanged over the period. In the USA, Lilly's price has increased steadily, although volumes and sales have begun to decline.

In the other countries where there is competition Lilly has surrendered market share to competitors.

In Canada, New Zealand, Spain and Sweden, Lilly has maintained a significant price premium over its competitors so that its loss in sales is not as much as its loss in volume.

In Australia there is little if any difference in price between Lilly and the other suppliers and Lilly has kept a significant market share.

In the UK Lilly has also maintained its price above its rivals but has lost much more of its market to them.

The first two graphs on the following page show the Lilly price and the average price of all other suppliers in US dollars. The second two graphs show the same adjusted with the average US dollar rate for the period 1990-01 to 2000-01.

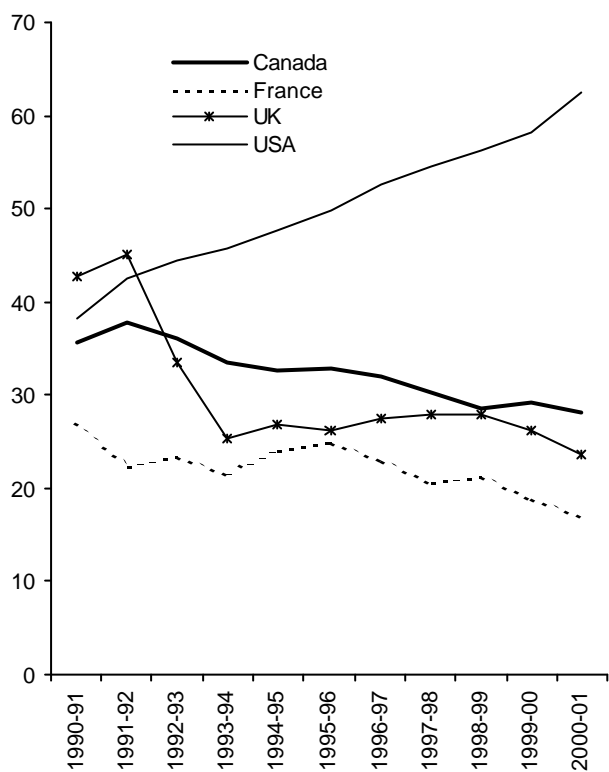
The Lilly price in the USA starts at a higher level (US\$38) than all the other countries and increases across the period to US\$62. The Canadian Lilly price starts at a lower level (US\$36) and increases slightly from there.

With the exception of Australia and New Zealand, all the other countries have similar profiles in that the price is virtually unchanged although each country starts from somewhat different prices. France and Spain in particular start at quite low levels.

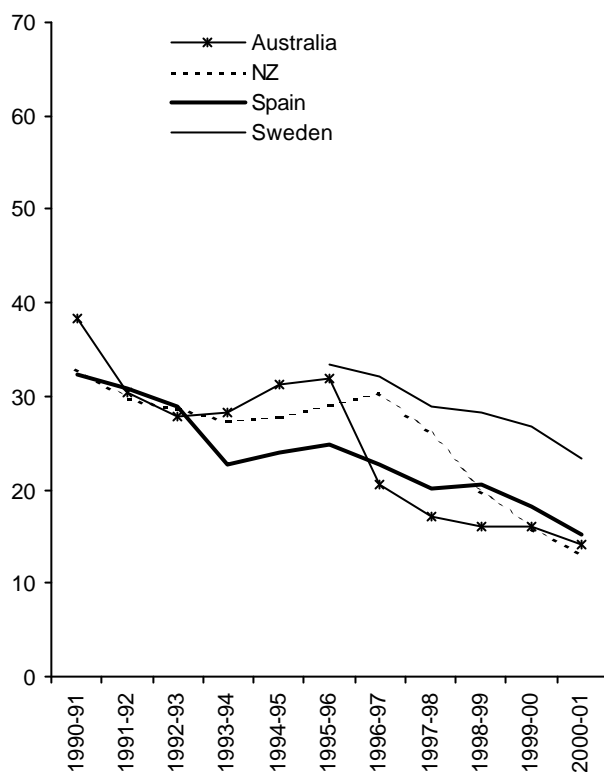
Australia and New Zealand start at somewhat higher prices but decline during the period, so that their finishing prices are also the lowest. In Australia's case however this only starts after competition arrives.

The **average generic prices** show a somewhat different pattern. Canada, New Zealand and the UK show steep falls in prices although for the latter two this is only over a single year. In Australia generic prices seem to have stabilised after a fall and this is also the case for Spain and Sweden.

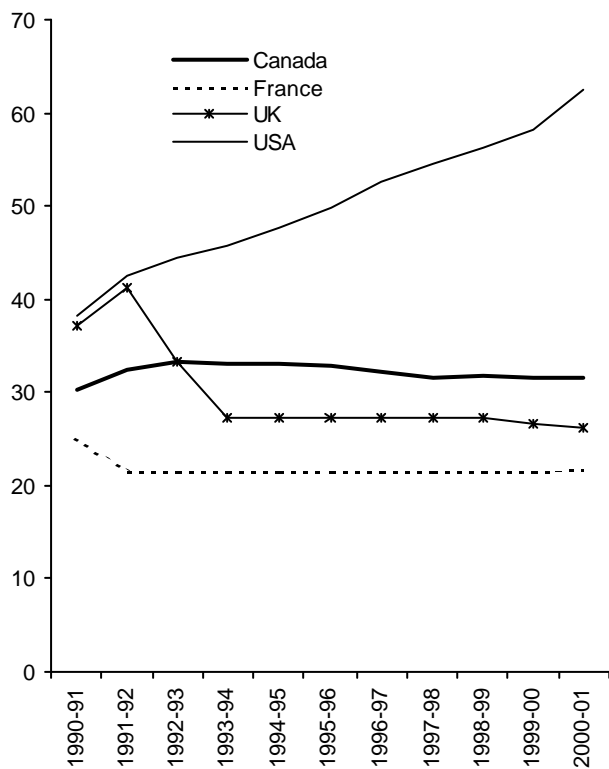
**Fluoxetine 20mg/28
Lilly Prices USD**



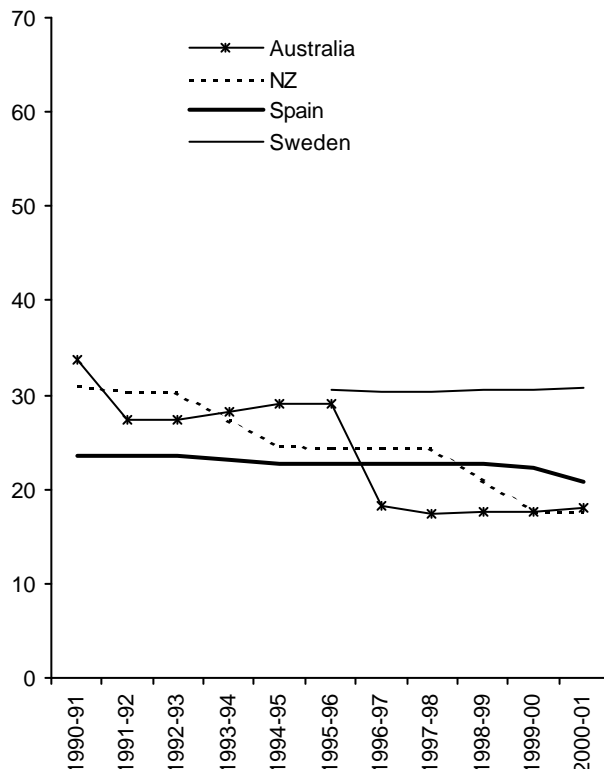
**Fluoxetine 20mg/28
Lilly Prices USD**



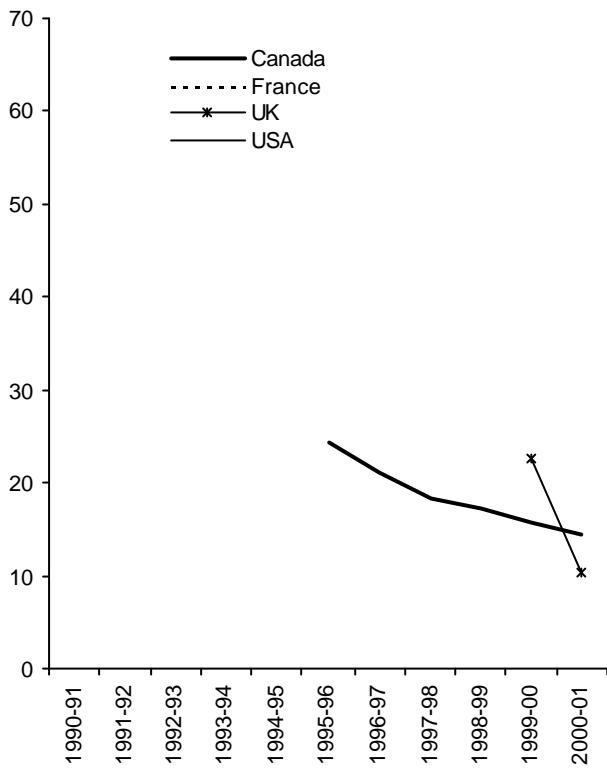
**Fluoxetine 20mg/28
Lilly Prices LCD**



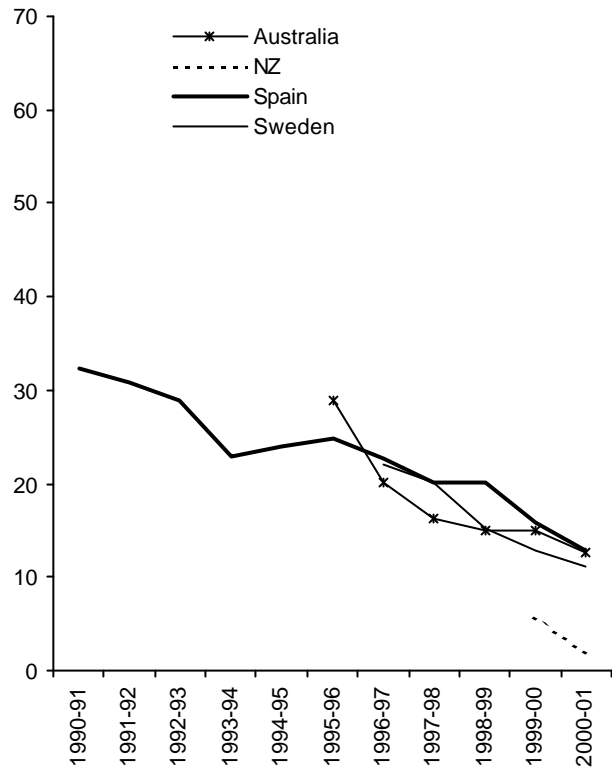
**Fluoxetine 20mg/28
Lilly Prices LCD**



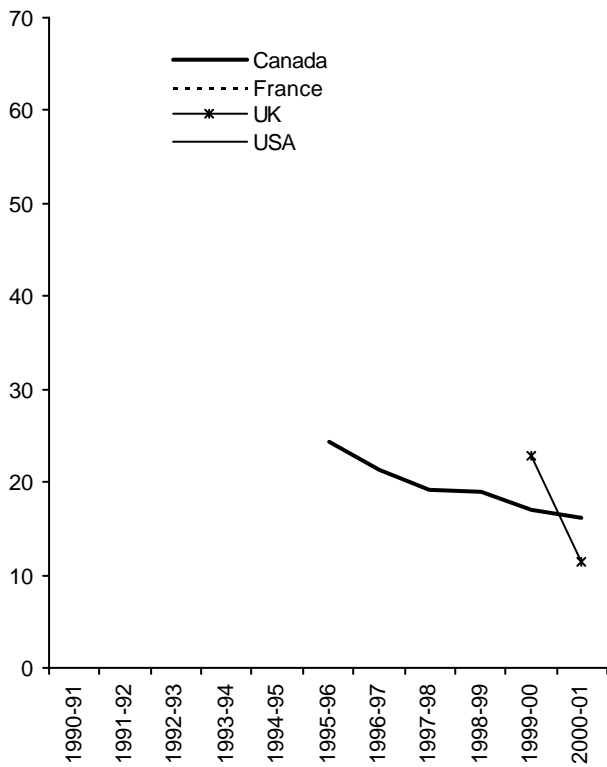
**Fluoxetine 20mg/28
Non-Lilly Prices USD**



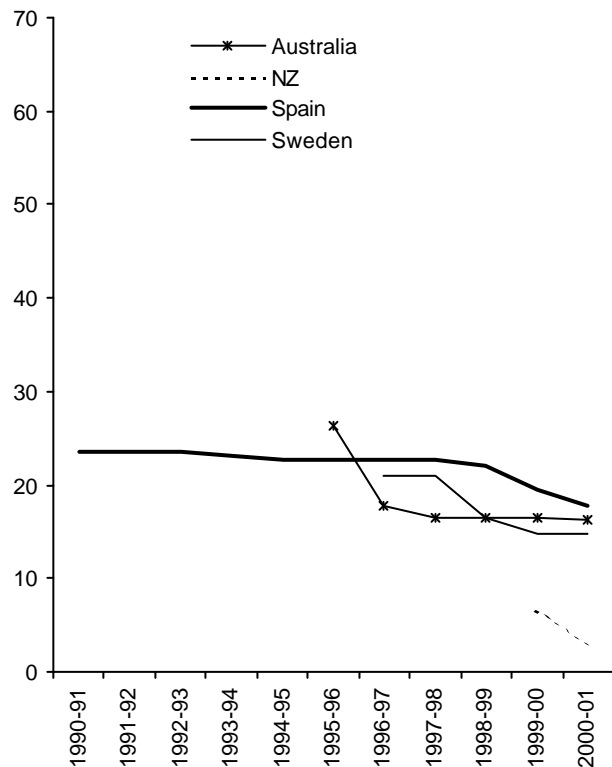
**Fluoxetine 20mg/28
Non-Lilly Prices USD**



**Fluoxetine 20mg/28
Non-Lilly Prices LCD**



**Fluoxetine 20mg/28
Non-Lilly Prices LCD**



5. Cholesterol Reducers – the Statins

High levels of cholesterol are associated with cardiovascular disease – in particular heart disease and stroke. Although other treatments for high levels of cholesterol do exist, the introduction of the HMG CoA reductase inhibitors (“statins”) in the late 1980s effectively created the market for cholesterol reducers.

Simvastatin was the original statin and was released in Australia in 1990. Pravastatin followed in 1994, fluvastatin in 1996 and atorvastatin in 1998.

As these are relatively recent drugs, there has generally only been one supplier of each except in countries which have comarketing or coproduction arrangements. Competition for simvastatin arrived in Sweden in 1999-00, and for pravastatin in Canada and Sweden in 2000-01.

Competition in the statin markets is therefore mainly among drugs that are still under patent and generics play little if any part.

Graphs showing the relative importance of the various types of statins in each country are shown on the following pages.

In each country, simvastatin has been the market leader, but in all cases has been challenged strongly by atorvastatin, which typically enters the market in 1996-97 or 1997-98. Pravastatin has played a relatively minor role except in Canada, France and Spain – in France it has outstripped simvastatin and has about equal market share with atorvastatin. Fluvastatin has not been significant in any country, except briefly in New Zealand.

Simvastatin has a comfortable lead over atorvastatin in Sweden, and is just ahead in Australia and the UK. Atorvastatin has clear leadership in Canada, New Zealand, and the USA, and is just ahead in France and Spain.

These results suggest that simvastatin demonstrated superior efficacy on average over pravastatin and fluvastatin, but relinquished this after atorvastatin arrived.

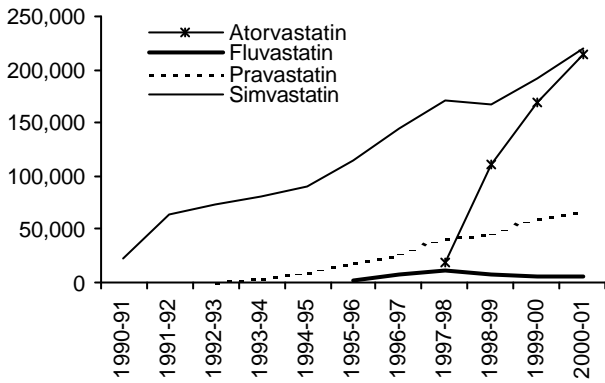
The final set of graphs in this section shows the prices for a standardised pack of 30 10mg tablets of Merck’s simvastatin and Pfizer’s atorvastatin. Prices are given in US dollars converted from local currency units by the average US dollar rate for the period 1990-01 to 2000-0.

Once again these graphs demonstrate the tendency for brand name drug prices to rise in the USA. In Europe the price remains virtually unchanged during the period, while Canada and New Zealand recorded substantial drops in price. In Canada this may have been a reaction to the introduction of atorvastatin which rapidly outstripped simvastatin. This may also be the case in New Zealand but is also likely to reflect the relatively high starting price in that country.

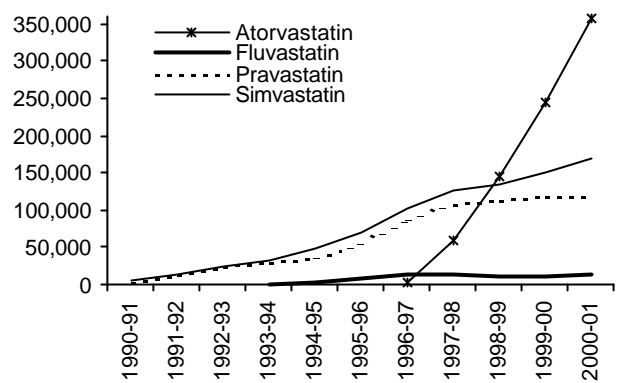
The starting price for simvastatin is fairly low in Australia and the price experienced a mild fall over the period.

Atorvastatin prices exhibit much less decline which in part is due to the short time it has been on the market and the strength of demand for the drug. Australia and New Zealand both have low starting prices and still manage to extract a price reduction.

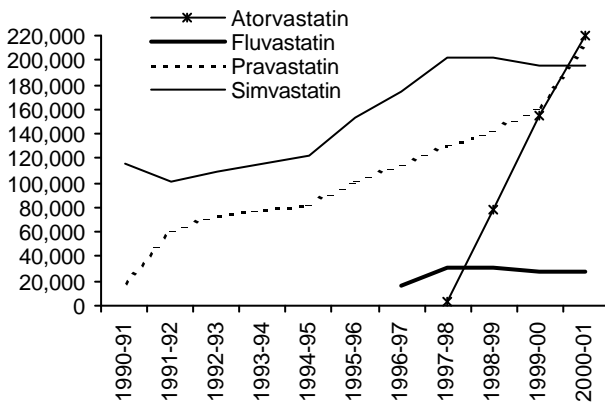
Australia Statins Sales



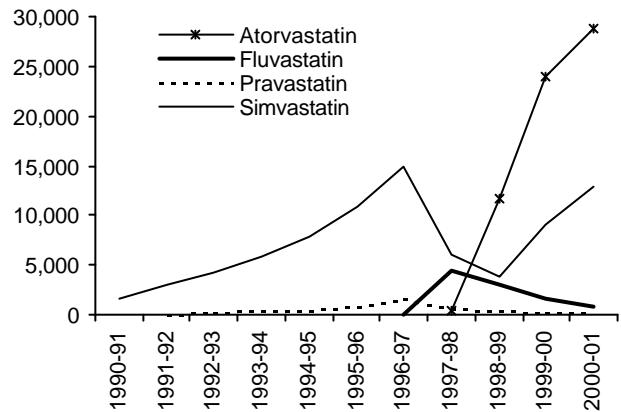
Canada Statins Sales



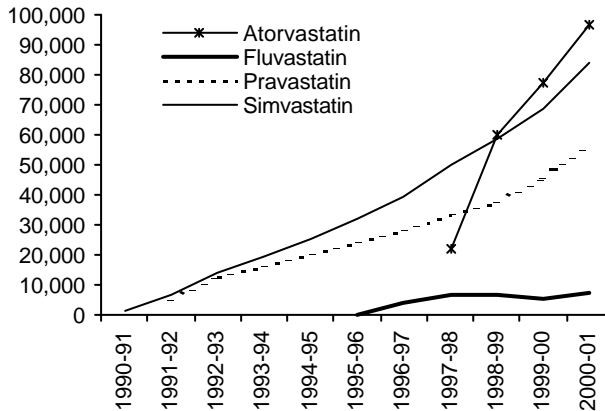
France Statins Sales



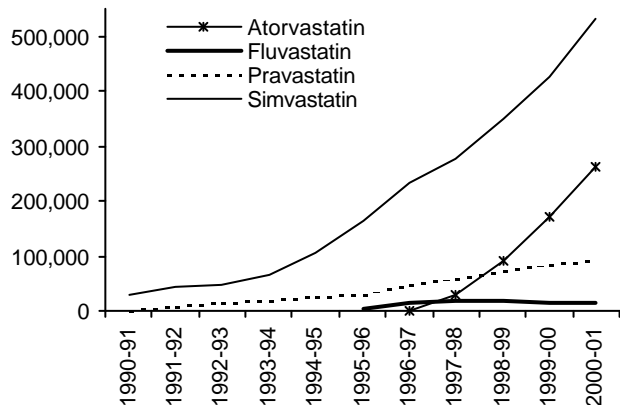
NZ Statins Sales



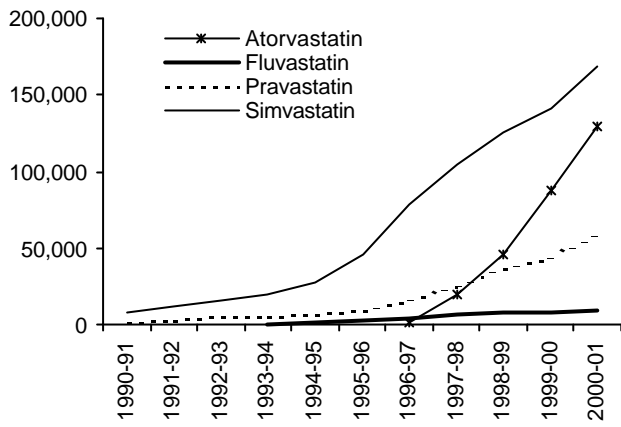
Spain Statins Sales



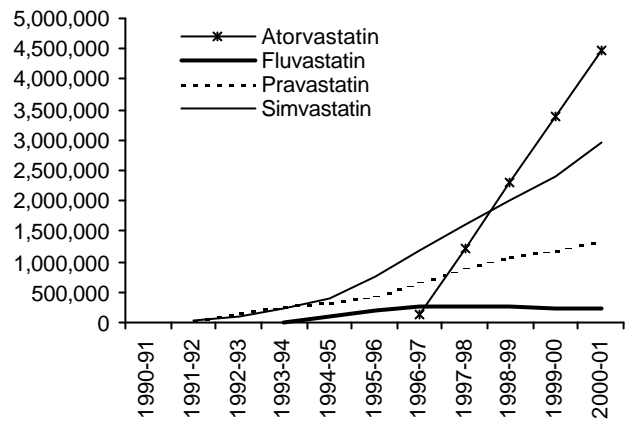
Sweden Statins Sales



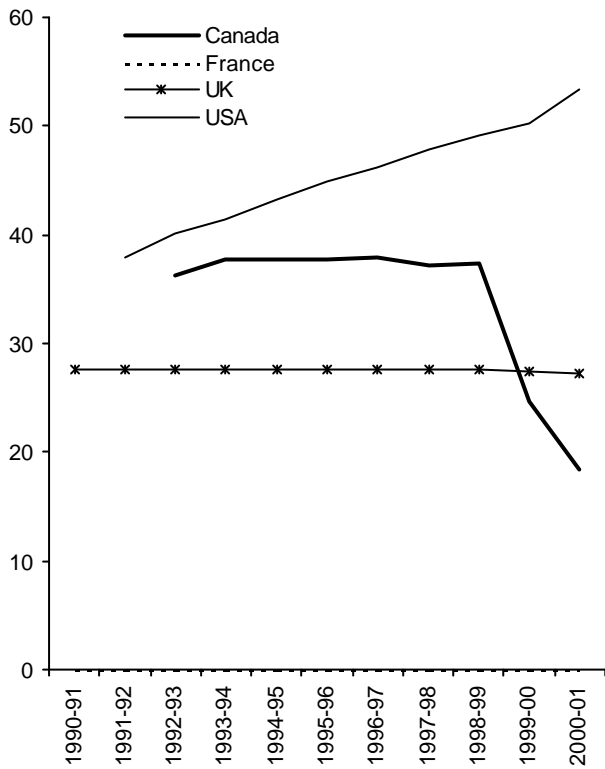
UK Statins Sales



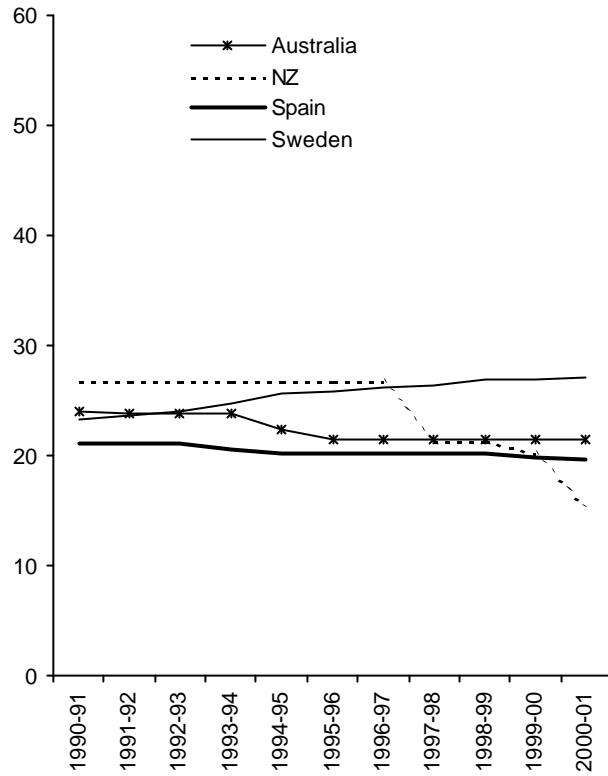
USA Statins Sales



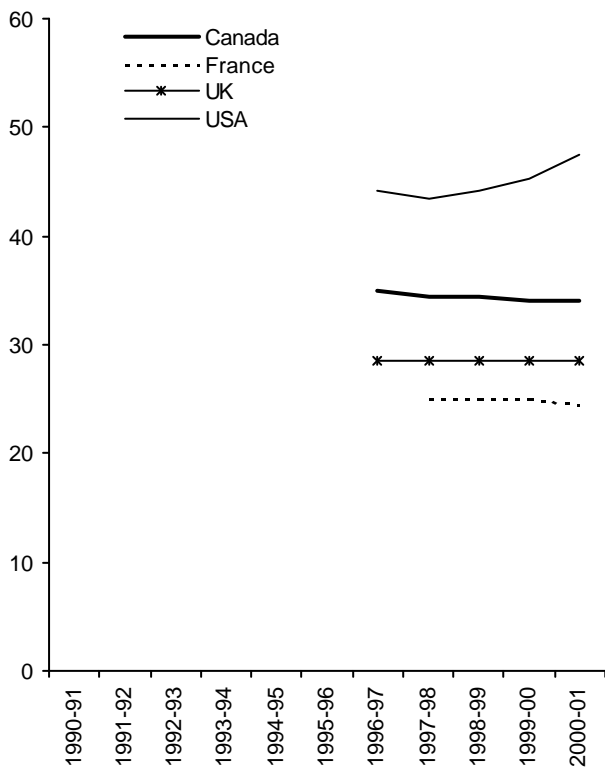
**Simvastatin 10mg/30
Merck Prices LCD**



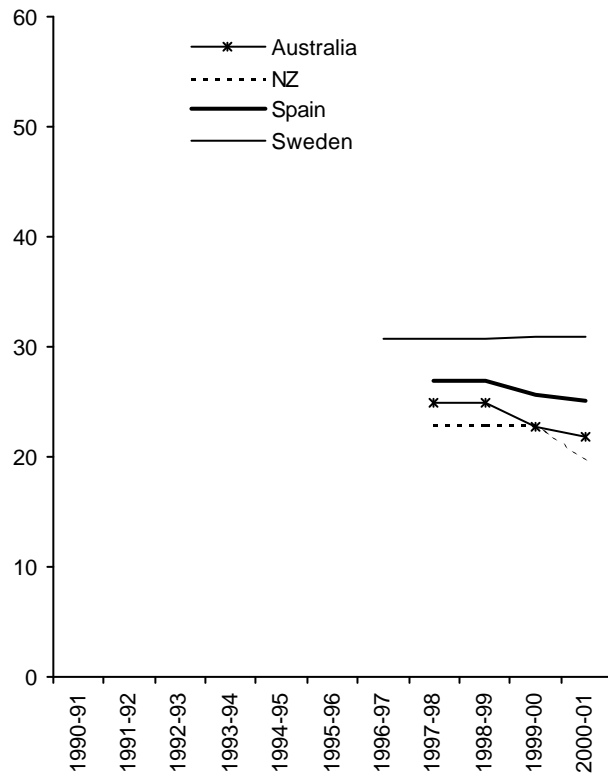
**Simvastatin 10mg/30
Merck Prices LCD**



**Atorvastatin 10mg/30
Pfizer Prices LCD**



**Atorvastatin 10mg/30
Pfizer Prices LCD**



6. Conclusions

This paper has examined the markets for 3 types of drugs in 10 different countries. The analysis suggests that the most active competition among drugs is in terms of their efficacy in treating disease. For peptic ulcers the proton pump inhibitors replaced the H₂-receptor antagonists, for antidepressants the SSRIs replaced earlier less effective drugs and the statins virtually created the market for cholesterol reducing drugs. Much of the growth in cost is associated with the strong demand arising from the ability of these drugs to meet previously unmet need.

Even though all new drugs start out in the market with a patent protecting them from direct competition, they still face competition within their class of drugs. Among the H₂-receptor antagonists, ranitidine held out against 3 other similar drugs and omeprazole did the same. The original SSRI, fluoxetine, lost out to later SSRIs, paroxetine and sertraline. Among the statins, the original drug simvastatin has been strongly challenged by the more recent atorvastatin.

This competition is evident among all the countries in this study, although the relative fates of each drug differ somewhat from country to country.

The arrival of competition from generic suppliers of the same chemical entity occurs after patent expiry. For the 2 case studies examined here, ranitidine and fluoxetine, this happened after they had already begun to be displaced by newer drugs in the market. This means that the savings from reduced price of generic drugs is not as large as it might otherwise be.

In most countries, the arrival of generics puts downward pressure on the average price of the drug.

The reaction of the producer of the original drug however differs significantly from country to country. In the USA and to a lesser extent in Canada, the original producer keeps the price high – in the USA the price keeps on rising. There is wide disparity with the price of generics and this latter price tends to fall steeply over time. In Australia and New Zealand, the government purchasing power acts to reduce the price of the original drug over time and to keep the price of original drug and generics together.

In the European countries, the prices of original drugs change only slowly, if at all, and the prices of generics tend to follow them.

These findings confirm those of the Congressional Budget Office in its analysis of drug prices in the USA.⁹ They found that there is significant price competition in the USA and that this often takes the form of discounts being offered to those purchasers that were members of pharmacy benefit managers or similar bulk purchasing organisations with standard formularies that can significantly influence a drug's market share. The entry of generic competitors has little effect on the prices of the

⁹ Congressional Budget Office, "How Increased Competition from Generic Drugs has Affected Prices and Returns in the Pharmaceutical Industry", July 1998, pp xi-xiii.

original brand name drug, although the discounts offered by supplier are likely to be larger than before. The same effect occurs when “follower” drugs enter the market.

Except for Canada and the USA, the supply of pharmaceuticals is controlled to a greater or lesser extent by central purchasing systems covering most of the population, who are required to pay only a fraction of a drug’s cost, if anything.

Australia and New Zealand, appear to have been more successful than the European countries in reducing the prices of drugs within patent and extracting the potential for reduced prices once generic competition is possible.

APPENDIX

GRAPHS USED IN CASE STUDIES

- A. RANITIDINE**
- B. FLUOXETINE**

A. RANITIDINE

Figure Aust Ranitidine 150mg/60 Volume

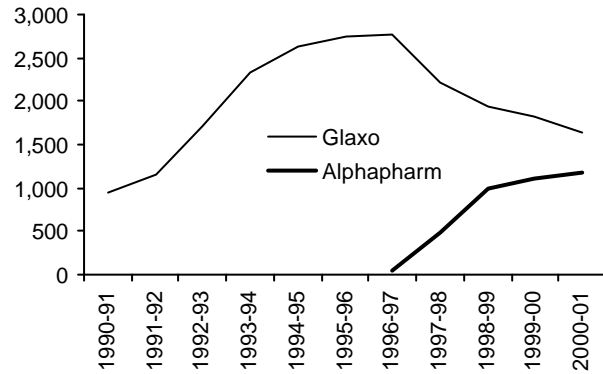


Figure Aust Ranitidine 150mg/60 Price

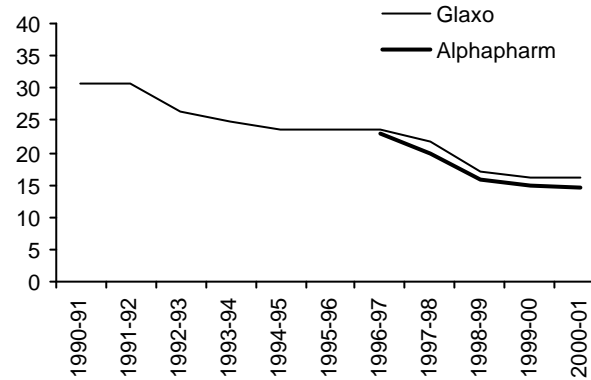


Figure Aust Ranitidine 150mg/60 Sales

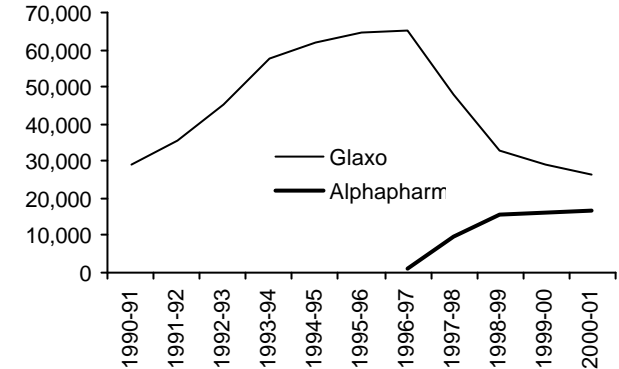


Figure Can Ranitidine 150mg/60 Volume

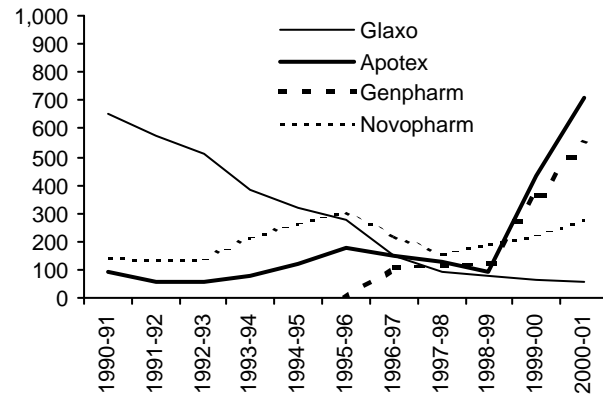


Figure Can Ranitidine 150mg/60 Price

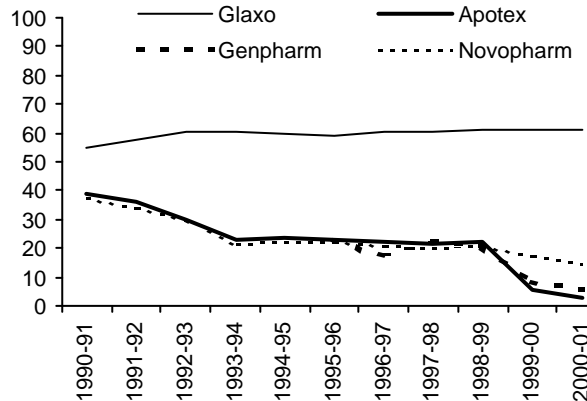
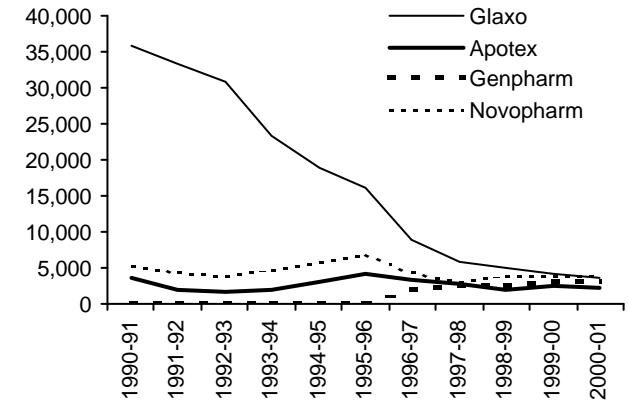


Figure Can Ranitidine 150mg/60 Sales



A. RANITIDINE

Figure France Ranitidine 150mg/30 Volume

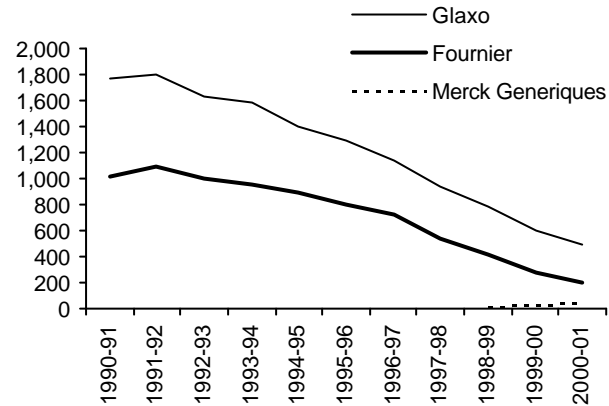


Figure France Ranitidine 150mg/30 Price

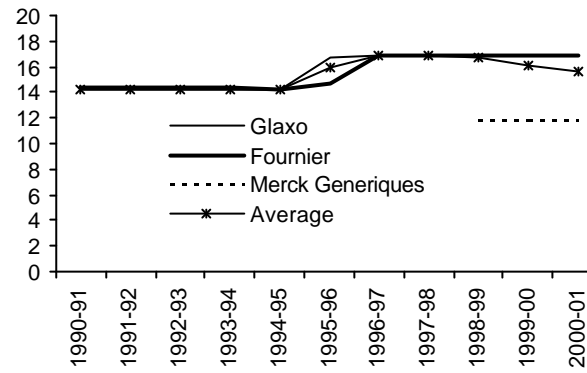


Figure France Ranitidine 150mg/30 Sales

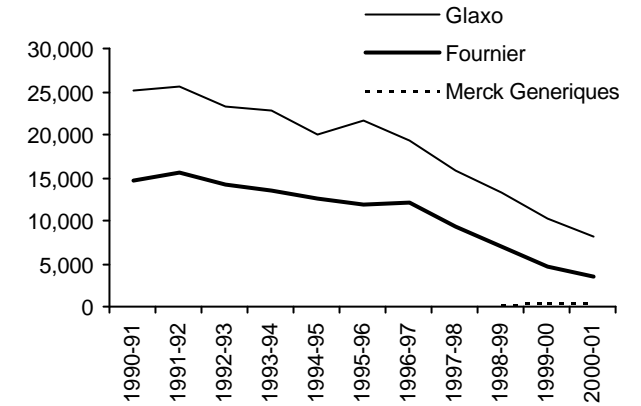


Figure NZ Ranitidine 150mg/60 Volume

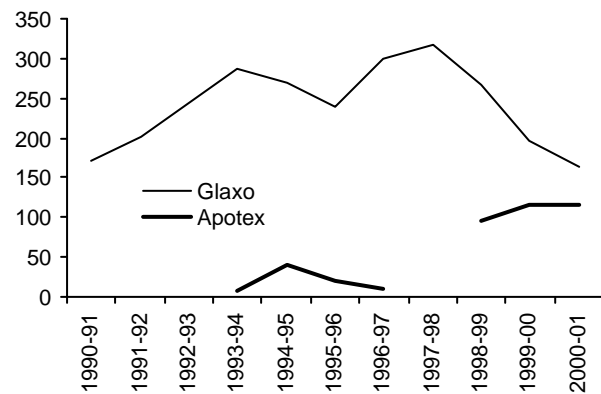


Figure NZ Ranitidine 150mg/60 Price

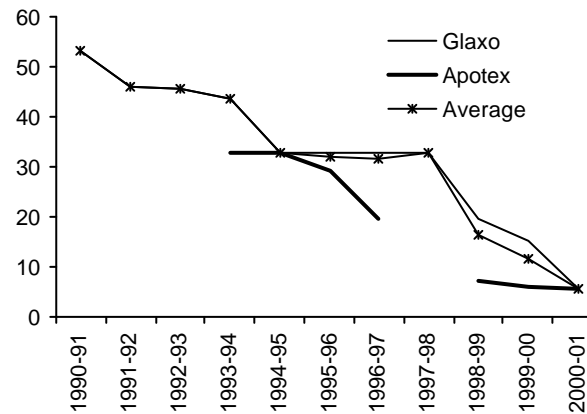
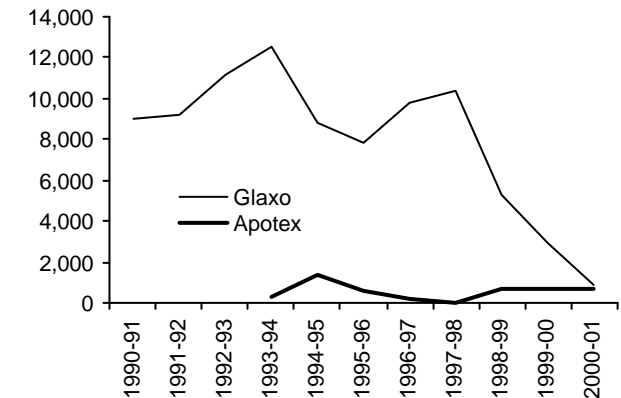


Figure NZ Ranitidine 150mg/60 Sales



A. RANITIDINE

Figure Spain Ranitidine 150mg/28 Volume

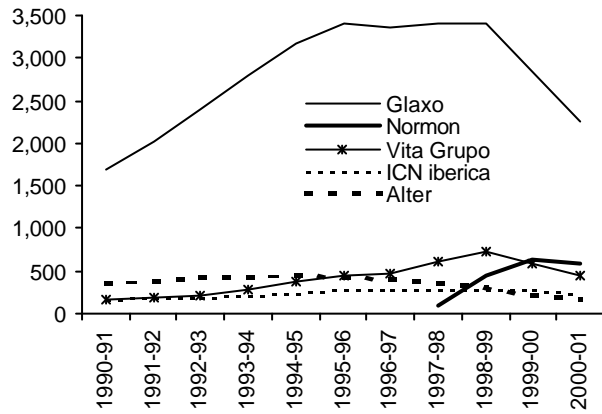


Figure Spain Ranitidine 150mg/28 Price

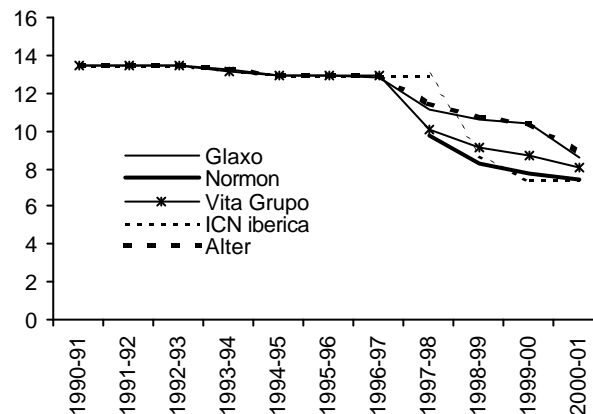


Figure Spain Ranitidine 150mg/28 Sales

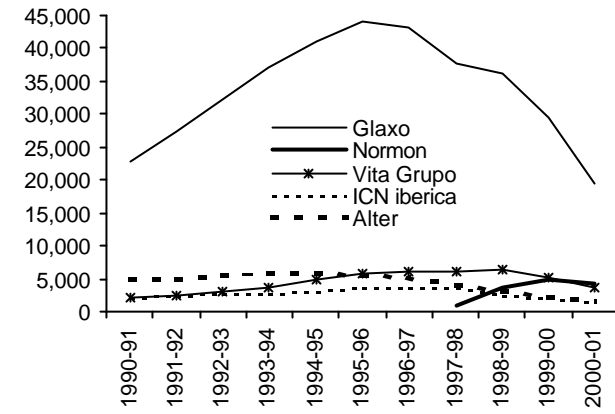


Figure Sweden Ranitidine 150mg/60 Volume

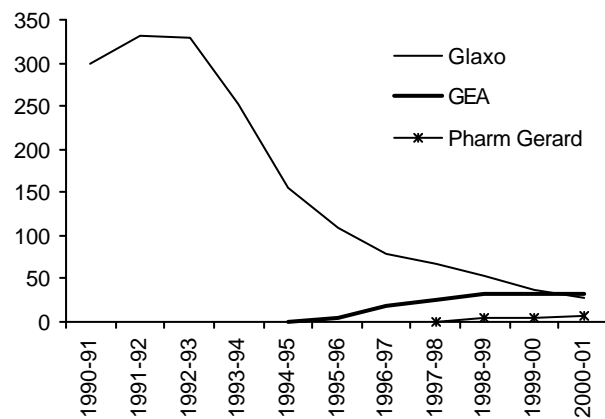


Figure Sweden Ranitidine 150mg/60 Price

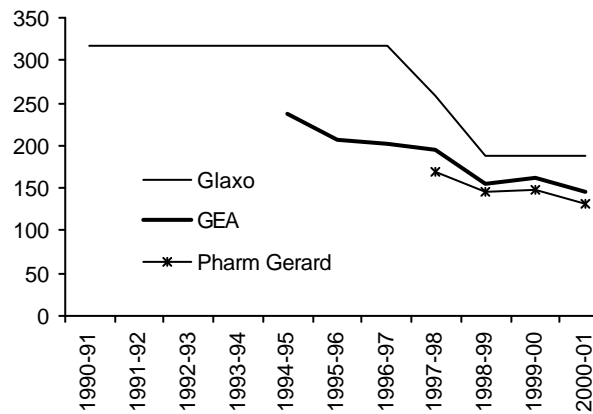
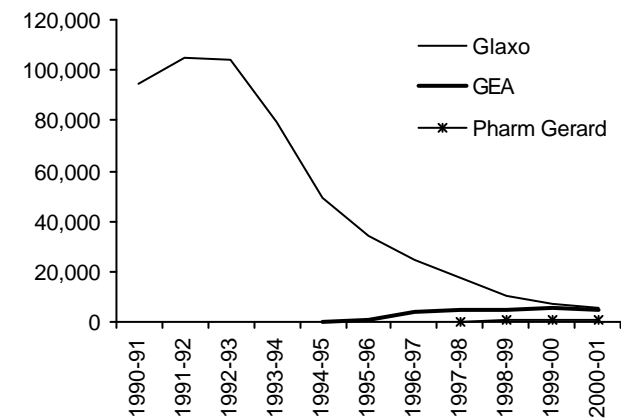


Figure Sweden Ranitidine 150mg/60 Sales



A. RANITIDINE

Figure UK Ranitidine 150mg/60 Volume

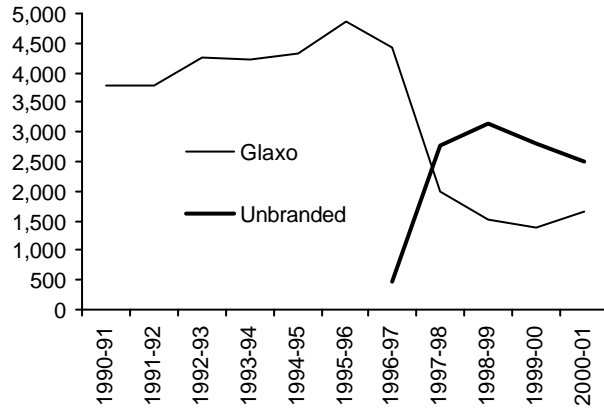


Figure UK Ranitidine 150mg/60 Price

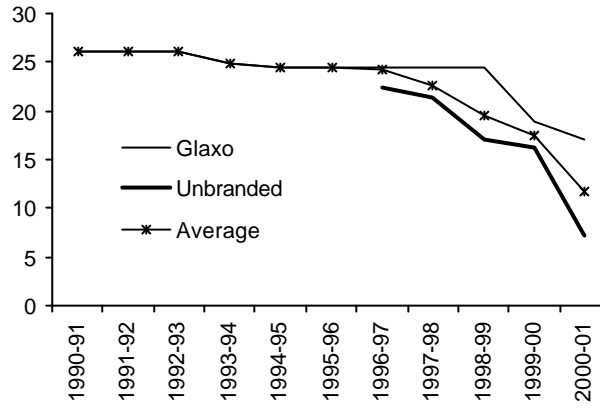


Figure UK Ranitidine 150mg/60 Sales

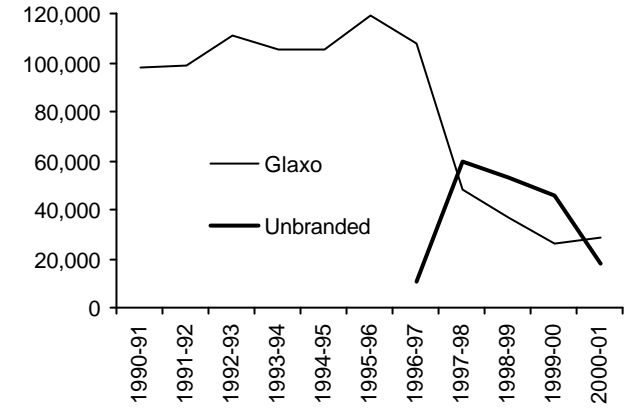


Figure USA Ranitidine 150mg/60 Volume

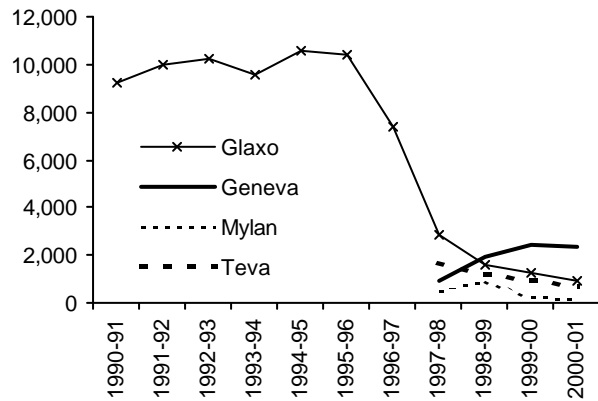


Figure USA Ranitidine 150mg/60 Prices

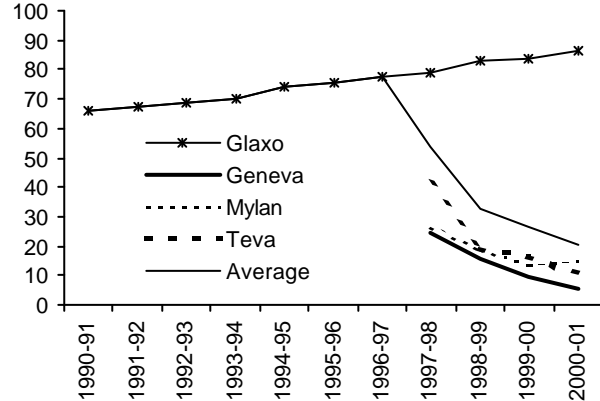
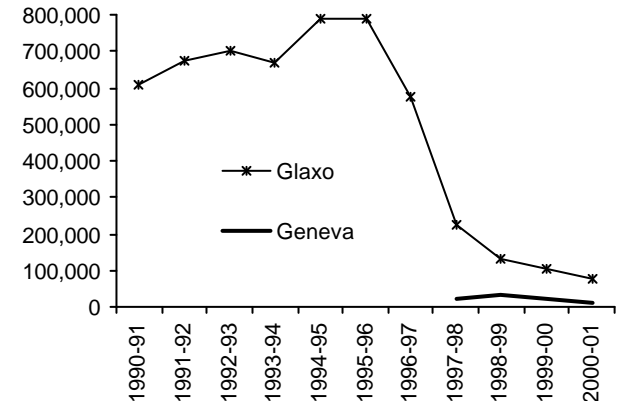
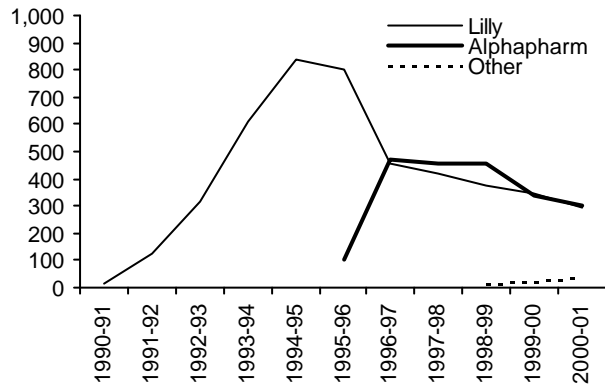


Figure USA Ranitidine 150mg/60 Sales

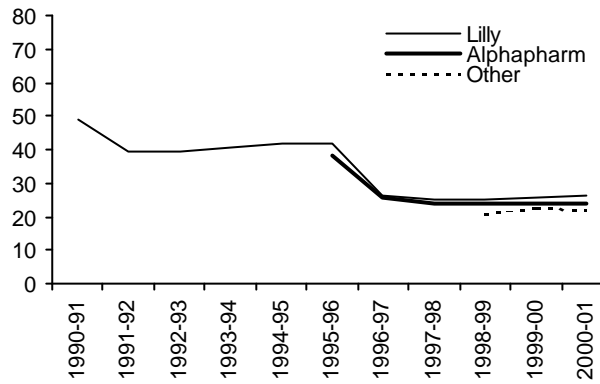


B. FLUOXETINE

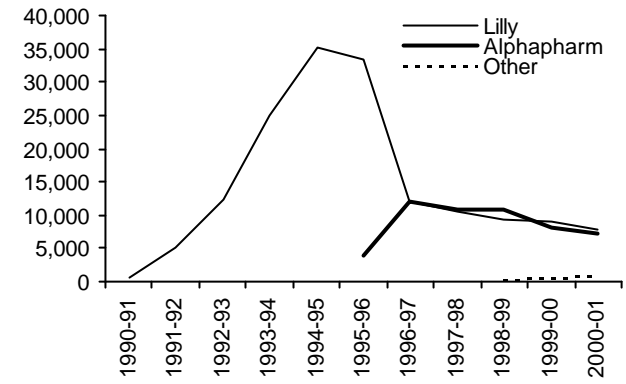
Australia Fluoxetine 20mg/28 Volume



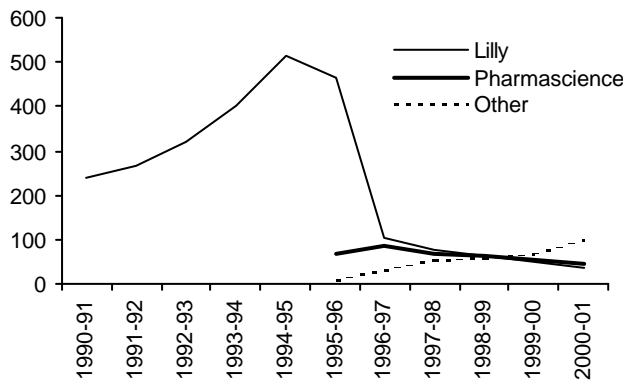
Australia Fluoxetine 20mg/28 Price



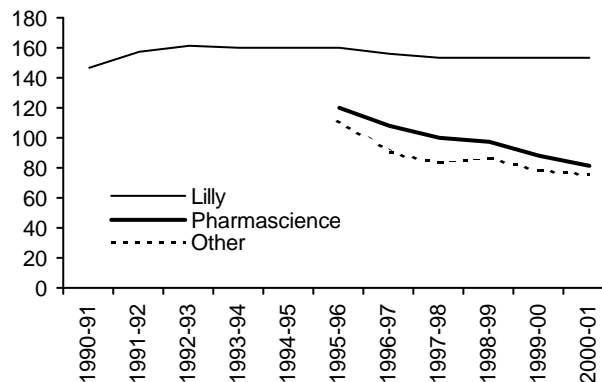
Australia Fluoxetine 20mg/28 Sales



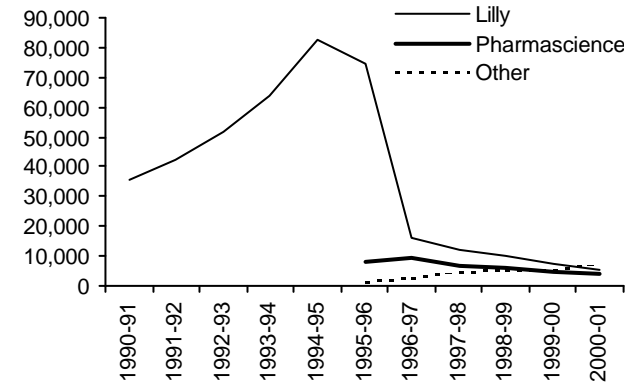
Canada Fluoxetine 20mg/100 Volume



Canada Fluoxetine 20mg/100 Price

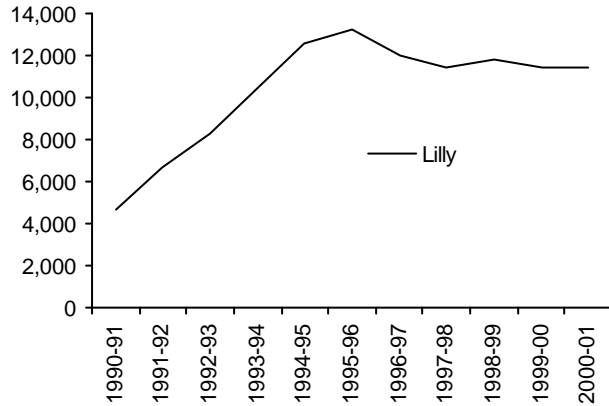


Canada Fluoxetine 20mg/100 Sales

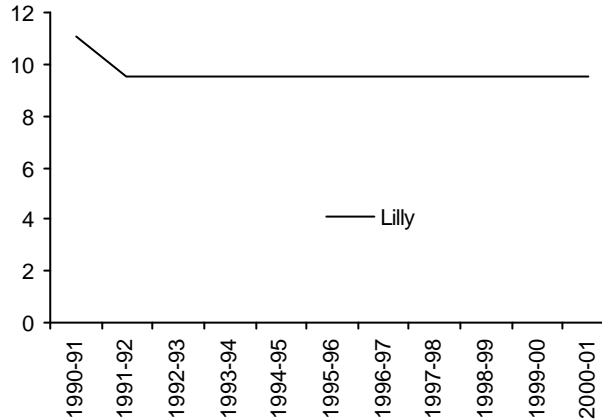


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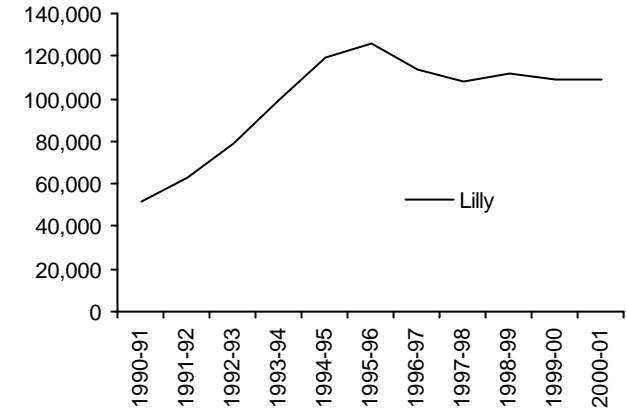
France Fluoxetine 20mg/14 Volume



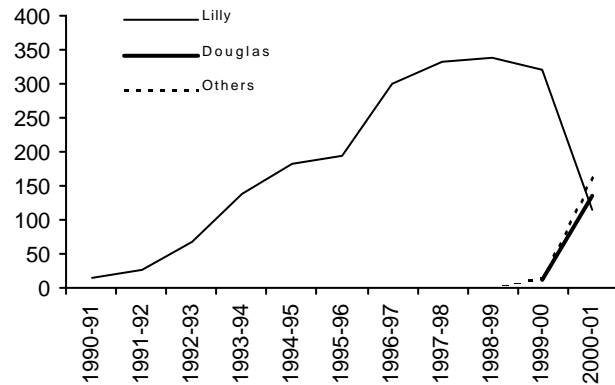
France Fluoxetine 20mg/14 Price



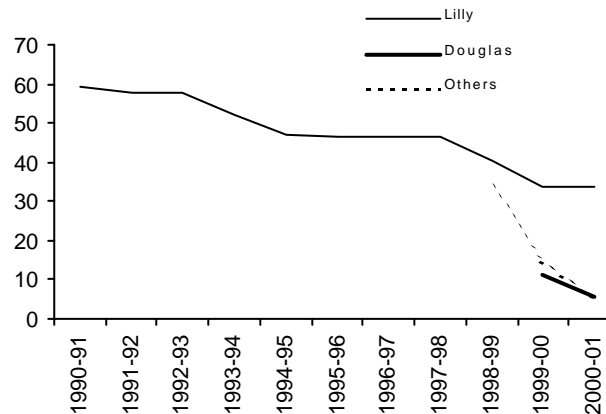
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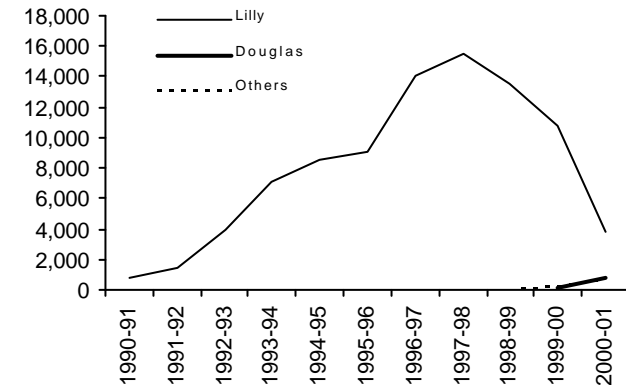
NZ Fluoxetine 20mg/30 Volume



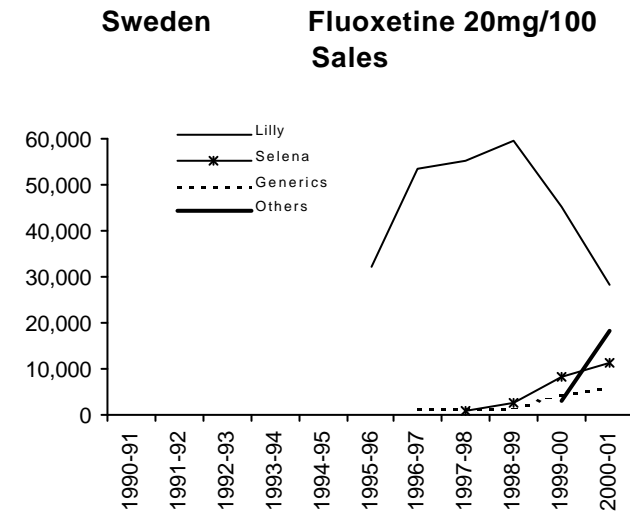
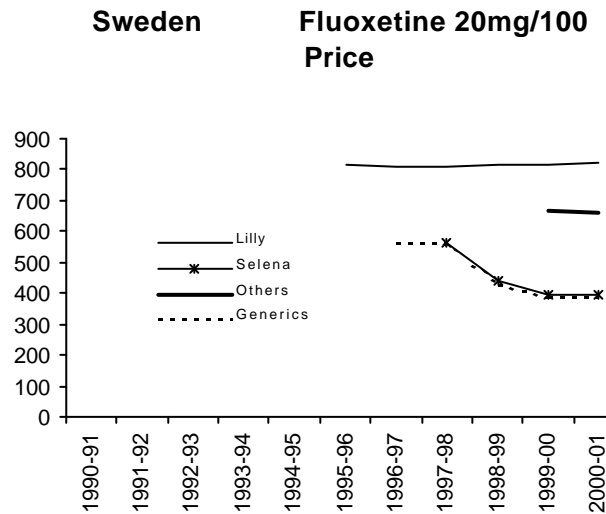
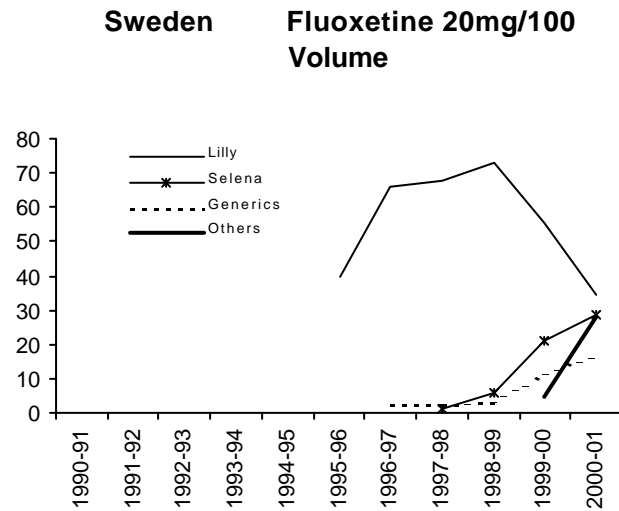
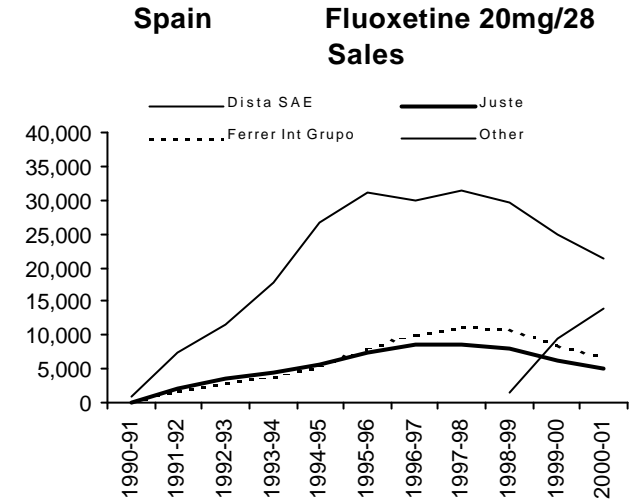
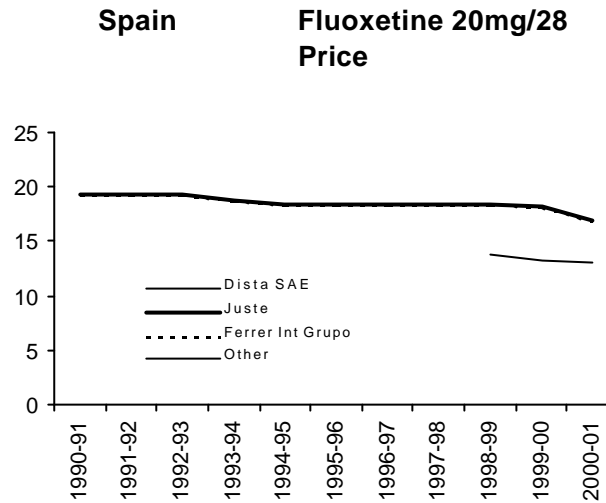
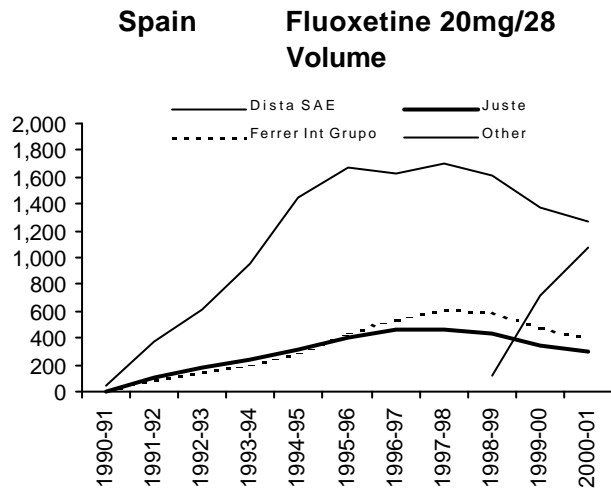
NZ Fluoxetine 20mg/30 Price



NZ Fluoxetine 20mg/30 Sales



B. FLUOXETINE

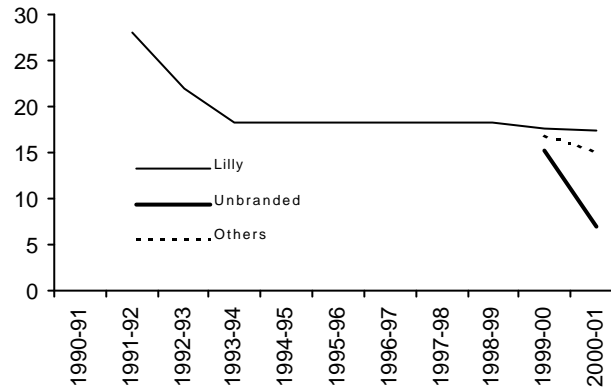


B. FLUOXETINE

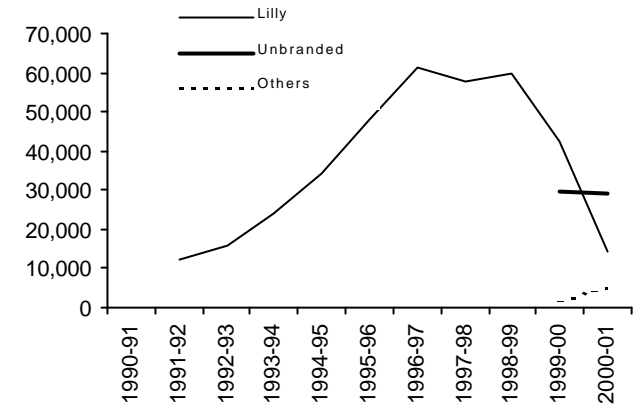
UK Fluoxetine 20mg/30 Volume



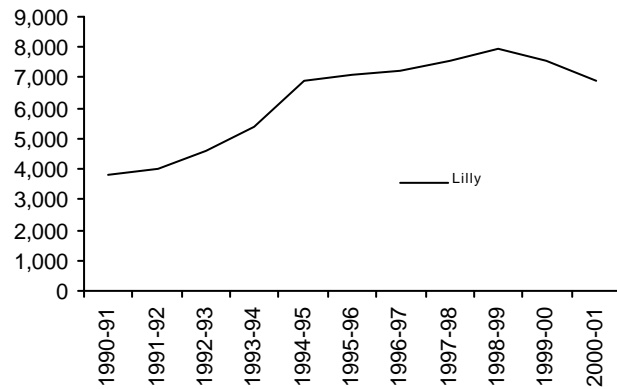
UK Fluoxetine 20mg/30 Price



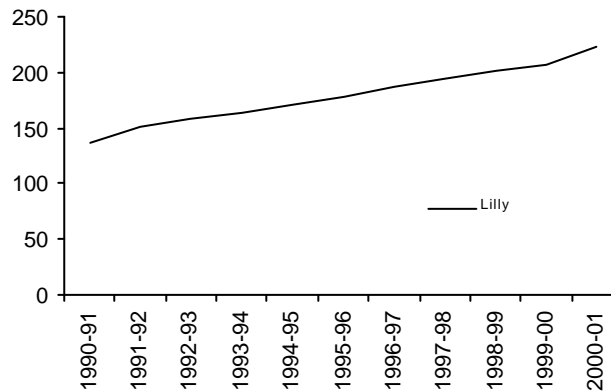
UK Fluoxetine 20mg/30 Sales



USA Fluoxetine 20mg/100 Volume



USA Fluoxetine 20mg/100 Price



USA Fluoxetine 20mg/100 Sales

