

THE RPI AND THE HICP

Sources and methods for the compilation of the Retail Price Index and the Harmonised Index of Consumer Prices

Compiled by the Consumer Prices Unit

May 2008

Foreword

This document, compiled by the Consumer Prices Unit of the National Statistics Office, presents a detailed account of the methodologies used for the monthly working of the Retail Price Index (RPI) and the Harmonised Index of Consumer Prices (HICP).

The HICP component of this methodological explanation follows the recommendations of Eurostat. The document is intended for a better understanding of these two indices by economic analysts and researchers. Concurrently with this technical document, the NSO is also publishing a booklet entitled *The RPI in Plain Language* intended for more general reference.

I would like to thank the staff of the Unit: Keith Borg, Lara Grech, Sephora Debono, Sue Mercieca, Graziella Fenech and Karen Zarb who contributed to the compilation of these methodological explanations.

Reno Camilleri
Acting Director General

May 2008

TABLE OF CONTENTS

	Page
Chapter 1 Introducing the Retail Price Index (RPI) and the Harmonised Index of Consumer Prices (HICP)	5
1.1 An overview	
1.2 Aims and Scope	
1.2.1 Retail Price Index	
1.2.2 Harmonised Index of Consumer Prices	
1.3 Parities and Disparities – RPI vs. HICP	
1.4 Use of the RPI	
Chapter 2 Sampling Methods and Procedures	9
2.1 Weights	
2.2 Districts	
2.3 Localities	
2.4 Outlets	
Chapter 3 Collection & Treatment of Prices	16
3.1 Price Collection Procedure	
3.2 Validation Procedure	
3.3 Seasonal Items	
3.4 Services and Special Items	
3.4.1 Rents	
3.4.2 Doctors, Dentists, Consultants and Veterinary Services	
3.4.3 Educational Fees	
3.4.4 Tariffs	
3.4.5 Fuels	
3.4.6 School Transport Fees	
3.4.7 Financial Services	
3.5 Quality Adjustments	
3.5.1 Direct Price Comparison	
3.5.2 Computers Option Cost Index	
3.5.3 New Cars Hedonic Index	
3.6 Closing Outlets	
Chapter 4 Methodological Issues	24
4.1 Fixed-base Index vs. Chain-linked Index	
4.2 Computation of the Indices	

Chapter 1 ~ Introducing the Retail Price Index (RPI) and the Harmonised Index of Consumer Prices (HICP)

1.1 ~ An Overview

All items that are bought for consumption purposes have a price, which may vary over time. Price indices are designed to measure such changes. A congenial way of understanding the nature of such indices is to envisage a very large shopping basket consisting of different kinds of goods and services bought by a typical household. As the prices of individual items in this basket vary, so does the total cost of the basket. Price indices are measures of the month-to-month change in this total cost.

No two households spend their money in exactly the same way. Although price indices do not apply to any one household or person, they reflect the phenomenon of inflation for the great majority of households.

This document describes the procedures used by the National Statistics Office (NSO) to produce the Retail Price Index (RPI) and the Harmonised Index of Consumer Prices (HICP). It is primarily aimed at the users of the RPI and the HICP who want to undertake an in-depth analysis of the data and formulae used in the calculation. This manual does not attempt to go into every detail. However, it will answer the majority of questions that are most frequently put to the NSO with regards to the RPI and HICP methodologies.

1.2 ~ Aims and Scope

1.2.1 ~ Retail Price Index

The Retail Price Index (RPI) measures in index form the monthly changes in the cost of purchasing a constant representative basket of consumer goods and services. It is used by both private and public sectors for the adjustment of wages, salaries and rents. Although it may not be considered to be an ideal measure of inflation, it is generally regarded as the best domestic economic barometer.

The RPI cannot be considered to be a 'cost of living' index in the true sense of the word. That said, it is widely used for this purpose. The Index provides a basic measurement of what the average household would need to spend in order to purchase the same goods and services it chooses to buy at a particular point in time.

Essentially, the RPI measures price changes and does not take into account the manner in which households change their pattern of expenditure.

The Index is compiled and published in accordance with a specific calendar date set by the Consumer Prices Unit of the National Statistics Office following its review by the RPI Advisory Board. The latter was set up in 1990

through an Incomes Policy Agreement. This is composed of members representing the three social partners.

The monthly index is published and commented upon in a National Statistics Office News Release, in the Government Gazette and on the NSO website. A detailed analysis is included in the Economic Survey published by the Economic Policy Division and in the Quarterly Review of the Central Bank of Malta.

1.2.2 ~ Harmonised Index of Consumer Prices

The Harmonised Index of Consumer Prices (HICP) is calculated in each Member State of the European Union as required under Article 121 of the Treaty of Amsterdam (109j).

The aim of the HICP is to produce a measure of inflation by means of the Retail Price Index on a comparable basis, taking into account differences in national definitions. The HICP is intended to provide institutions, governments and economic and social partners with a set of harmonised and reliable statistics on which to base their decisions. Although the basket of goods and services varies from country to country, all Member States are expected to abide by the same set of regulations, which can be considered to be the backbone of the HICP.

The HICP is strictly speaking not a 'cost of living' index. Put differently, it is *not* a measure of the change in the minimum cost for maintaining a constant 'standard of living' across time, since factors other than 'pure price' changes may be captured in the Index.

During the period 2002-2003 preparations were undertaken by the Consumer Prices Unit of the National Statistics Office to compile an HICP Index. An Interim HICP with base year 1996=100 and based on the RPI has been worked out and sent to Eurostat. During 2003 prices were collected in respect of the proper HICP and a new weighting structure derived from the Household Budgetary Survey 2000/2001 and from the National Accounts.

The HICP is the primary tool of the European Central Bank in assessing price stability in the Euro Area. To this end, the HICP produced by the NSO is aggregated to produce the EU25 HICP using country shares in total household final consumption as weights in order to derive the inflation rate at European level.

The HICP is published locally by the NSO and internationally by Eurostat.

1.3 ~ Parities and Disparities – RPI vs. HICP

At first glance, the RPI and the HICP might seem very similar to each other although conceptually different. This section is intended to shed light on the parities and

disparities between the Retail Price Index and the Harmonised Index of Consumer Prices.

The main parities are:

- Same geographic coverage;
- Reference to the country as a whole;
- Same price collection methodologies;
- Virtual homogeneity of items;
- Same classification (COICOP/HICP);
- Same outlets for price collection;
- Same price data;
- Use of the same formula for the computation of indices (Ratio of Arithmetic Mean prices within localities);
- Same treatment of seasonal items;
- Same treatment of missing prices and quality adjustment;
- Non-coverage income tax and national insurance contributions.

The main disparities are:

- The RPI has 10 *sections* while the HICP has 12 *divisions* (the terms sections and divisions mean the same thing, however, a different nomenclature is used in defining the HICP and RPI groupings);
- Newly significant goods can be introduced in the HICP but not in the RPI;
- Different weighting structure;
- The RPI and HICP weights add up to 100 and 1000 respectively;
- Different frequency of renewal and updating of weights;
- Tourist Accommodation and Social Protection indices feature in the HICP only;
- The reference period (base year) of the RPI is 2002 whereas the reference period of the HICP is 2005;
- The RPI covers all monetary consumption expenditure incurred by the Maltese residents whereas the HICP covers all '*Household Final Monetary Consumption Expenditure*' irrespective of nationality or residence status;
- Although both RPI and HICP are Laspeyres-type indices, the former is a Fixed-base index whereas the latter is a Chain-linked index;
- The RPI is monitored by the RPI Advisory Board, whereas the HICP is monitored by Eurostat.

1.4 ~ Use of the RPI

The RPI is the best available indicator of inflation. It is used by government and private companies for the adjustment of salaries, pensions and allowances. However,

one of the frequently asked questions is how to adjust rents and maintenance agreements using the RPI. Normally, in both cases the annual index of inflation is used.

For simplification intents and purposes, it is imperative to look at a practical example. Let us assume someone wants to calculate the new rental or maintenance rate if currently, it stands at €115 and the last time the agreement was revised was in the year 2005. The annual index of inflation in 2005 and 2007 stood at 684.88 and 712.68 respectively. This means that the inflation rate rounded to two decimal places that prevailed in the selected period was:

$$\left(\frac{(712.68 - 684.88)}{684.88} \right) \times 100 = 4.06\%$$

Therefore, the new rental or maintenance rate rounded to two decimal places can be derived as follows:

$$€115 \times (1 + 4.06\%) = €119.67$$

Usually the annual index of inflation and the corresponding annual inflation rate for year x is officialised towards the second half of the first quarter in year $x+1$. However, the official inflation rate for a particular year is the equivalent of the 12-month moving average rate of inflation prevailing in December of that same year.

Chapter 2 ~ Sampling Methods and Procedures

2.1 ~ Weights

The weighting structure for the Retail Price Index series was derived from the best available estimates of the weekly expenditure on consumer goods and services by a specified number of households in the country. These estimates were derived mainly from the Household Budgetary Survey carried out by the National Statistics Office during 2000/2001.

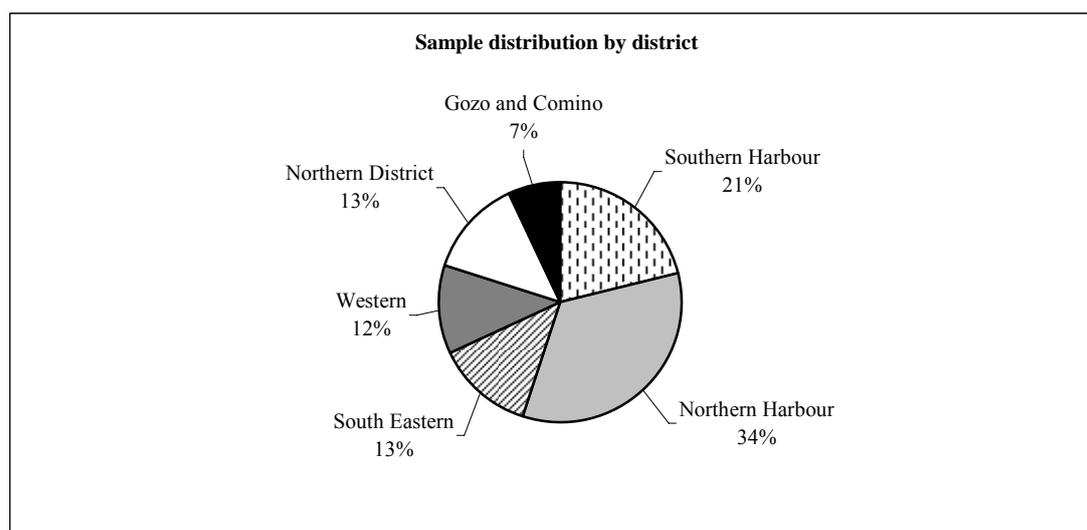
The coverage of this HBS differed from the previous ones. No selection criteria were attributed. The target population consisted of all private households in Malta, irrespective of income bracket and number of persons in the household. The Survey covered a national representative sample of 2,586 households throughout the country. The following tables and chart illustrate the sample distribution of households:

Table 1

District	Distribution by sample household size				
	Household Members				
	1	2	3	4	5+
	%				
Southern Harbour	11	24	26	27	12
Northern Harbour	10	24	26	26	14
South Eastern	4	22	24	32	18
Western	7	23	21	31	18
Northern District	8	19	22	34	17
Gozo and Comino	9	21	22	27	21

Table 2

District	Sample distribution by district
	%
Southern Harbour	21
Northern Harbour	34
South Eastern	13
Western	12
Northern District	13
Gozo and Comino	7

Chart 1

The Survey was carried out between 1st March 2000 and 28th February 2001. The participant households provided information on household composition, accommodation facilities and regular household expenditure. Individual household members also provided details of their income and regular expenditure over a period of three consecutive weeks. Accordingly, they were required to maintain records of their day-to-day expenditure.

The amount of household expenditure allocated to different goods and services was worked out as a proportion of the total household expenditure. The HICP weights are complemented by expenditure figures from the National Accounts in order to make the Index more relevant and reliable in certain specific areas such as tourist expenditure and social protection. Table 3 comprises a snapshot of the HICP and RPI groupings and respective weights.

Table 3

<i>Group</i>	<i>COICOP-HICP</i>	<i>Weight</i>	<i>RPI groups</i>	<i>Weight</i>
<i>01</i>	<i>Food & Non-Alcoholic Beverages</i>	173.61	<i>Food (including food consumed in restaurants)</i>	23.82
<i>02</i>	<i>Alcohol & Tobacco</i>	46.41	<i>Beverages & Tobacco</i>	6.11
<i>03</i>	<i>Clothing & Footwear</i>	69.03	<i>Clothing & Footwear</i>	8.24
<i>04</i>	<i>Housing & Household Services</i>	72.57	<i>Housing</i>	7.57
<i>05</i>	<i>Furniture & Household Goods</i>	93.00	<i>Water, Electricity, Gas & Fuels</i>	2.25
<i>06</i>	<i>Health</i>	27.42	<i>Household Equipment & House Maintenance Costs</i>	7.65
<i>07</i>	<i>Transport</i>	142.44	<i>Personal Care & Health</i>	23.13
<i>08</i>	<i>Communication</i>	23.40	<i>Transport & Communications</i>	6.22
<i>09</i>	<i>Recreation & Culture</i>	100.79	<i>Recreation & Culture (including education)</i>	8.84
<i>10</i>	<i>Education</i>	9.85	<i>Other Goods & Services</i>	6.17
<i>11</i>	<i>Restaurants & Hotels</i>	188.67		
<i>12</i>	<i>Miscellaneous goods & Services</i>	52.81		
	Total	1000.00	Total	100.00

In the following pages, Table 4 and Chart 2 illustrate the weighting structure of the RPI, while Table 5 and Chart 3 illustrate the weighting structure of the HICP, both numerically and graphically.

Table 4

RPI Section	1971/72 1974=100	1980/81 1983=100	1988/89 1991=100	1994 1995=100	2000/01 2002=100
Food	40.08	41.91	36.78	29.92	23.82
Beverages & Tobacco	10.25	9.46	8.60	7.34	6.11
Clothing & Footwear	11.87	10.57	8.23	10.14	8.24
Housing	3.70	3.97	3.90	5.27	7.57
Water, Electricity, Gas & Fuels	2.90	3.14	2.83	2.53	2.25
Household Equipment & House Maintenance Costs	6.08	6.15	5.22	9.31	7.65
Personal Care & Health	9.41	9.93	13.40	16.00	23.13
Transport & Communications	4.81	5.55	6.35	6.47	6.22
Recreation & Culture	6.62	4.92	8.26	8.31	8.84
Other Goods and Services	4.28	4.40	6.43	4.71	6.17
Total	100.00	100.00	100.00	100.00	100.00

Chart 2

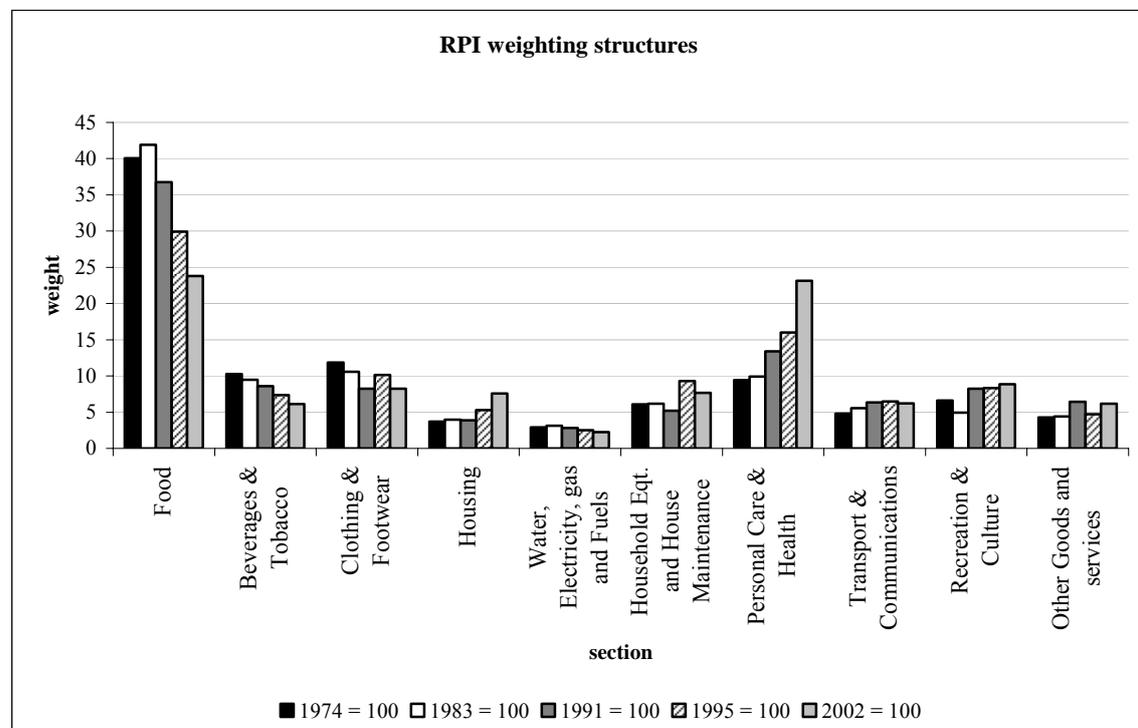
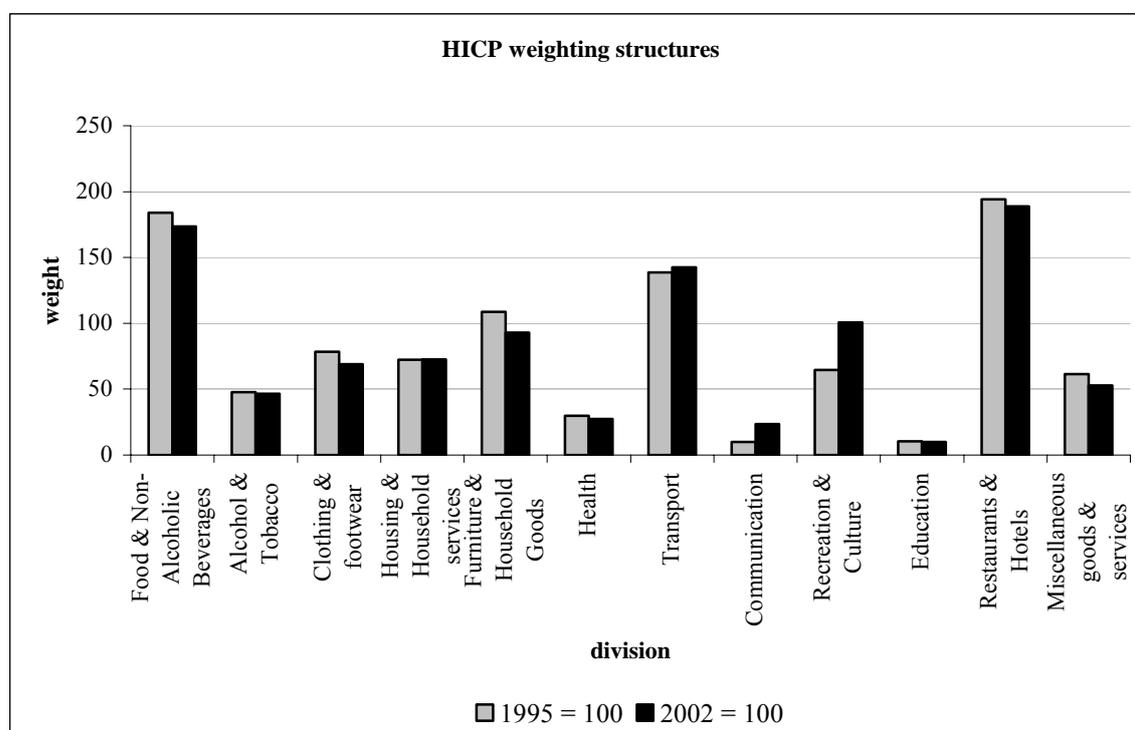


Table 5

HICP division	1994 1995=100	2000/01 2002=100
Food & Non-Alcoholic Beverages	184.00	173.61
Alcohol & Tobacco	47.73	46.41
Clothing & Footwear	78.47	69.03
Housing & Household Services	72.43	72.57
Furniture & Household Goods	108.64	93.00
Health	29.65	27.42
Transport	138.77	142.44
Communication	9.87	23.40
Recreation & Culture	64.56	100.79
Education	10.31	9.85
Restaurants & Hotels	194.08	188.67
Miscellaneous Goods & Services	61.49	52.81
Total	1000.00	1000.00

Chart 3



A new Household Budgetary Survey – HBS 2008 – is underway.

2.2 ~ Districts

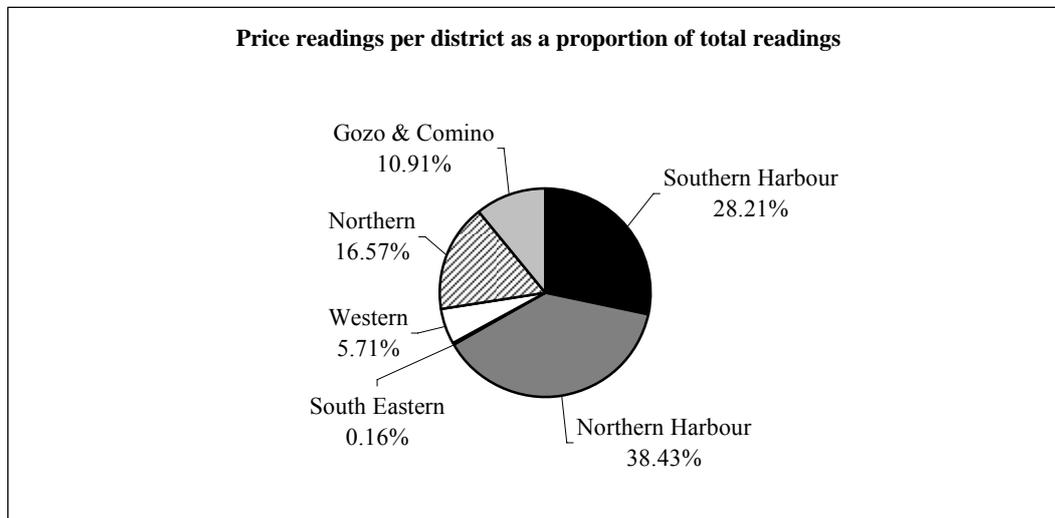
Table 6 segments the Malta and Gozo into six districts according to the NUTS classification (level 5).

Table 6

District	Locality	District	Locality
Southern Harbour	Valletta	Western	Mdina
	Birgu		Żebbuġ (Malta)
	Isla		Siġġiewi
	Bormla		Attard
	Żabbar		Balzan
	Fgura		Dingli
	Floriana		Iklin
	Kalkara		Lija
	Luqa	Rabat (Malta)	
	Marsa	Mtarfa	
	Paola	Northern	Gharghur
	Santa Luċija		Mellieħa
	Tarxien		Mġarr
	Xgħajra		Mosta
	Naxxar		
	San Pawl il-Baħar		
Northern Harbour	Qormi	Gozo & Comino	Rabat (Gozo)
	Birkirkara		Fontana
	Gżira		Għajnsielem & Comino
	Hamrun		Għarb
	Msida		Għasri
	Pembroke		Kerċem
	Pietà		Munxar
	San Ġiljan		Nadur
	San Ġwann		Qala
	Santa Venera		San Lawrenz
	Sliema		Sannat
	Swieqi		Xagħra
	Ta' Xbiex		Xewkija
	Żebbuġ (Gozo)		
South Eastern	Żejtun		
	Birzebbuga		
	Gudja		
	Għaxaq		
	Kirkop		
	Marsaskala		
	Marsaxlokk		
	Mqabba		
	Qrendi		
	Safi		
	Żurrieq		

The number of price readings from every district expressed as a proportion of the total number of readings is represented graphically in Chart 4.

Chart 4



2.3 ~ Localities

Prices for the Retail Price Index and for the Harmonised Index of Consumer Prices are being collected by a team of price collectors from a number of outlets throughout Malta and Gozo.

Price readings are made from seven main localities as follows:

1. Gozo
2. Valletta
3. Paola
4. Hamrun
5. Birkirkara
6. Sliema
7. Mosta

In addition, specific items are covered in non-main localities as follows:

8. Attard
9. Balzan
10. Blata l-Bajda
11. Fgura
12. Fleur-de-Lys
13. Floriana
14. Gudja
15. Gzira
16. Iklin
17. Lija

18. Marsa
19. Mellieħa
20. Msida
21. Naxxar
22. Qormi
23. Rabat
24. San Ġwann
25. Santa Venera
26. San Ġiljan
27. San Pawl il-Baħar
28. Ta' Xbiex
29. Tarxien
30. Żabbar
31. Żebbug
32. Żejtun

It is important to note the distinction between main and non-main localities. Main localities are those from which interviewers collect a considerable and consistent number of prices throughout the year. On the other hand, non-main localities are those from which interviewers collect particular goods and services that usually are not found in the main localities.

2.4 ~ Outlets

The outlets for price-reading purposes were derived, for the first time, from the Business Register according to the market share of each outlet. This ensures that the outlets covered are representative of the entire population.

2.5 ~ Item Selection

In past indices, price collectors were initially asked to collect prices for a specified brand (unit, origin and description) from all the outlets visited.

This practice has changed. Price collectors are free to choose a specific product for regular pricing. No further specifications and instructions are given and individual price collectors are free to select any item in the initial stage. The only restriction imposed on their choice is that the particular item has to be sought after by consumers, suitable for regular pricing and likely to be available in the long run. Once the item has been selected, price collectors are required to stick to those specifications for price readings.

This method ensures that the prices of a wide variety of product brands and qualities are collected in different places, reflecting the local tastes and preferences. This improves the representativeness of the items being monitored for price readings.

Chapter 3 ~ Collection & Treatment of Prices

3.1 ~ Price Collection Procedure

The following guidelines have been set to help the price collectors during price collection:

- Physical collection of prices is encouraged although some prices may be collected via other sources;
- Prices are collected on pre-specified dates, usually around the middle of the month to which the Index pertains;
- Prices of items that are observed to be highly volatile are examined at frequent intervals during the month being reviewed;
- The concept of ‘like with like’ comparison is emphasised. In other words, price collectors are asked to adhere to the specifications given as far as possible during price collection;
- The price being recorded should be the actual price that is charged to the consumer;
- Changing of outlets is discouraged. Nevertheless, in certain instances, outlets are changed. In such a case the details of the outlet and the name of the contact person are inserted in the price collection booklet in addition to the prices.

Price collectors are asked to pay particular attention to these common mistakes:

- Wrong unit, description and price;
- Vague description of items which can jeopardise ‘like with like’ comparisons;
- Select a price similar to the one recorded in the previous month rather than try to match the specifications.

The underlying premise of the RPI and the HICP is that the prices included are those actually paid by the consumer. The decision to accept or refuse a price is based on the following criteria:

Acceptance Criteria

- Consumption taxes are included in the price being recorded;
- Sale prices are included provided that the item will continue to be available after the sale period;
- In the case of list prices, shop owners are asked to confirm that the prices are actually those being charged to consumers.

Refusal Criteria

- Price readings are either estimates or averages;
- Prices of items that are subject to gift schemes are excluded;
- Shop-soiled, damaged or sub-standard articles being sold at clearance prices are excluded;
- Discount prices that are not available to all potential consumers are excluded;
- ‘Closing down sales’ are excluded.

It is very important for price collectors to check and verify any increase/decrease in the price with the preceding readings. Such changes can be due to a sale price, special offer etc., but can also be due to some mistake.

3.2 ~ Validation Procedure

It is the responsibility of the Consumer Prices unit staff members to validate manually all price quotations and query any significant discrepancies. Price collectors are to indicate any changes for the benefit of the Consumer Prices officials. This can be effected either in a space adjacent to the price quotation or in the special space provided at the end of each pricing booklet. These booklets include the full description of each pricing item in order to ensure an identical comparison on subsequent occasions.

When a price is rejected it does not necessarily mean that it is wrong. It may simply be out of line with the majority of prices collected elsewhere for the same item, or the particular price may have experienced a sharp and unexplained percentage increase or decrease.

Pricing for index purposes in Malta offers somewhat more difficulties than in any other country. The relatively small number of shops on the island, and the fact that most of the items (including food items) are imported, make the availability of particular brands over an extended period of time more problematic. We face problems such as the discontinuation of an item, the introduction of new items, and the replacement of old brands in the market on a regular basis.

In the case of the discontinued availability of a particular product, an alternative popular item is substituted after two months.

3.3 ~ Seasonal Items

The seasonal items in the RPI and the HICP are Fresh Vegetables, Fresh Fruit and Fresh or Chilled Fish.

Item monitoring of seasonal items varies from month to month according to market and weather conditions and hence according to fish, vegetable and fruit availability in each particular month.

Since these products are known to typically show sharp and irregular price changes, their prices are collected twice monthly, for two alternative weeks every month.

The method used for the compilation of these indices is a Rothwell-type method whereby the overall weights of Fish, Fruit and Vegetables are constant throughout the year but the weights of the individual items pertaining to these three groups are variable. When an item is off-season in a particular month, its corresponding weight is apportioned among the remaining items in that sub-group, provided that it is greater than 0. The schedules were drawn up on the basis of the findings of the HBS.

In the weighting scheme introduced in 2002, the number of seasonal items was considerably reduced so that the probability of finding the item is higher. It should be noted that all fruit and vegetable prices were collected since 2002. The same cannot be said about the Fish items. Fish items are excluded from the Index unless a benchmark of 32 per cent of all potential price readings is reached.

Table 7 illustrates the items pertaining to each seasonal group.

Table 7

Vegetables	Fruit	Fish
Carrots	Melons	Bogue
Dry Onions	Water Melons	Dogfish
Tomatoes	Grapes	Dorado
Vegetable Marrows	Bananas	Swordfish
Mushrooms	Oranges	Octopus
Cabbages	Apples	Squid
Cauliflower	Peaches	
Lettuce	Pears	
	Strawberries	

3.4 ~Services and Special Items

Almost all prices are monitored every month. However, in cases where there is reason to believe that prices tend to remain constant over the year, price collection is less regular. Such cases include:

3.4.1 ~ Rents

The owner-occupancy rate in Malta is approximately 70 per cent¹ and more than 17 per cent of the Maltese population lives in low rent controlled housing². Rents in the controlled market are revised at most once every year.

¹ Camilleri, D., Apap Bologna, L., Bonnici, G., and Magri, V. (2004). "Property Market Report – 2003," BICC.

² The Sunday Times – June 22, 2003. "Over 17% live in rent-controlled housing".

The House Rent and Garage Rent surveys are usually conducted on an annual basis. Information is requested on the amount of rent paid for furnished and unfurnished accommodation and in respect of rent payable on garages for domestic use. Our sample includes households living in both the rent controlled sector and the post-1996 rents (subject to the changes effected to the rent legislation in 1996). The survey is carried out in November. However, in February a follow-up survey is conducted by telephone to check whether prices had changed or not.

3.4.2 ~ Doctors, Dentists, Consultants and Veterinary Services

Fees charged are obtained through a postal sample survey sent to general practitioners, dentists, consultants and veterinary surgeons. A follow-up survey is conducted in June by telephone to record the changes in the fees charged, if any.

3.4.3 ~ Educational Fees

Private Tuition fees are obtained by telephone every March and October each year from a representative sample of teachers offering this service in respect of subjects at primary and secondary level. The subjects considered in this survey include Maltese, English, Mathematics and Physics.

School fees for private schools are obtained directly from schools at the beginning of the academic year (October) by telephone and checked again in the month of April using a postal survey. Usually this fee is revised in October.

3.4.4 ~ Tariffs

Base prices for Water and Electricity Services were calculated on the consumption as derived from the HBS for one- to five-person households plus the rental charge for a period of 120 days.

Base prices for local telephone bills were constructed on the various time bands during night and day for one- to five-person households. Data from the HBS and Maltacom have been used.

Owing to the volatility of prices in respect of Water and Electricity utilities, prices are collected on a monthly basis. All tariffs are collected from their respective websites.

3.4.5 ~ Fuels

The prices of fuels (kerosene, diesel, unleaded and LRP) are monitored on a monthly basis. Usually they do not change more than once every month but particular attention is being paid to the developments taking place in the sector vis-à-vis the liberalisation of the market.

3.4.6 ~ School Transport Fees

For the school transport fees a postal survey is carried out every April. The sample, which is deemed representative, is made up of organisations offering school transport services. The sample consists of more than 30 per cent of the entire population of operators in the market. In order to account for the distance of the trip, all prices are segmented into three categories (as shown in table 8 below): schools situated in the northern part of Malta, schools situated in the central part of Malta and schools situated in the southern part of Malta. Gozo is not included in this survey. All minibus/coach companies included in the sample are situated in the central part of Malta. Apart from gathering information about the distance, this survey discloses other relevant information such as the medium of transportation used, whether it's an unscheduled bus service or not and whether they form part of the cooperative of school buses or not.

Table 8

North	Central	South
Mellieħa, St.Paul's Bay, Buġibba, Mġarr, Xemxija, Għarghur	Attard, Lija, Mosta, Balzan, Naxxar, St. Venera, B'Kara, Mtarfa, Rabat, Dingli, Siggiewi, Haż-Żebbug, Sliema, Gżira, Ta' Xbiex, Pietà Hamrun, Msida, Valletta, St Andrews, Pembroke, St Julians, Paceville	Mqabba, Qrendi, Bormla, Isla, Kalkara, Birgu (Cottonera), Paola, Fgura, Marsa, Żabbar, Żejtun, Għaxaq, Gudja, Marsascala, Marsaxlokk, Birzebbuġia

3.4.7 ~ Financial Services

Credit card charges, the use of bank's safe deposit boxes and legal bank charges are monitored on a quarterly basis from the two leading banks in Malta (Bank of Valletta and HSBC).

On the other hand, the currency exchange charges are collected on a monthly basis. Once again all rates are obtained from the websites of the two leading banks in Malta. This is the item with the largest weight in this division. The selling and buying prices for notes and cheques are used to compile the currency exchange charges index. A benchmark of 300 units is used for two different currencies namely: American Dollar and Pound Sterling. Weights to distinguish between banks, currencies and type of transaction are used. The index is usually subject to fluctuations which are mainly due to outside shocks. However, it should be noted that the two currencies used for the compilation of the currency exchange index are relatively stable, thus assuring the exclusion of vigorous fluctuations. In a nutshell, the methodology employed is the following: the commission earned by the banks for buying and selling foreign currency is established. Then the amount spent by

consumers to exchange the 300 units is calculated. Thus, the Index reflects both changes in the commission charged by banks and fluctuations in the exchange rates considered in the index. The index takes into account both selling and buying of Euro. Currency exchange charges have been introduced in the HICP *only* in December 2004.

3.5 ~ Quality Adjustments

Quality change occurs whenever a change in specification has resulted in a significant difference in utility to the consumer between a new variety (or model) of a good or service and a good or service previously considered for pricing. As an intended measure of pure price change over time, price indices should not reflect these changes in quality. However, ‘pure’ price changes are only possible if the actual brands for every item remain the same over time, which is very unlikely, since brands of goods and services tend to improve in quality over time or simply become obsolete. To this end, quality adjustments are necessary.

Quality adjustment is defined as ‘the procedure of making an allowance for a quality change by increasing or decreasing the observed current or reference prices by a factor or an amount equivalent to the value of that quality change.’ Put differently, it is a process which requires estimating the market value of any differences in the price-determining characteristics of the two products and adjusting - by addition, subtraction or multiplication by a coefficient - the observed price of the replacement product.

In the RPI series, significant improvement was registered in the quality adjustment procedures.

3.5.1 ~ Direct Price Comparison

Direct Price Comparison refers to a situation where the price of a new item, which differs slightly from the base item, is accepted. Put differently, it entails “obtaining a replacement which may be treated as essentially identical.” The underlying assumption here is that the observed difference in price between the new and old product is entirely due to price change, not quality difference.

This method is applied to the Clothing items and non-food products. In essence this means that the interviewers are encouraged to observe the same item every month. When this is not possible, interviewers are urged to collect the price for a similar item, possibly with the same brand, and to give the full description of the new item. This new item might be rejected during the vetting phase due to a substantial price deviation or a totally different description. In the eventuality of ignoring such a price for compilation purposes, interviewers are expected to look for another comparable price in the next reading.

Likewise, this method is employed in the case of food items as well with one slight difference. When a particular food product is discontinued, interviewers are allowed to choose a replacement product provided that the two are substitutes. The new item must be popular and comparable with the replaced item with respect to quality and unit descriptions. The new substitute is considered for compilation purposes only after three consecutive monthly quotations have been observed.

3.5.2 ~ Computers Option Cost Index

This method of Quality Adjustment was introduced for the purpose of monitoring computers. It refers to a situation where a feature which was previously optional in a model becomes standard. Where the price of the option is known, it can be used as a measure of the change in quality of the model. It is argued that, when the feature was optional, not everyone chose to buy it, so the value to purchasers on average was less than the option cost.

It is possible to take the whole cost of the option as its value to the consumer. However, it was decided to take an arbitrary fraction of the option cost as the measure of value. This is common practice although there is no clear justification to take a particular fraction of option costs. But it was deemed appropriate to take 50 per cent of the option costs, on the grounds that consumers would expect savings (benefits) when options are incorporated in the product build and presumably adjust their quality valuations accordingly; i.e. taking a fraction of the option cost as value to the consumer implies that consumer values depend on their expectations.

3.5.3 ~ New Cars Hedonic Index

The hedonic technique is probably one of the fastest-growing methods of direct quality adjustment. Introduced more than 70 years ago, the hedonic methodology provides quantitative information on the importance of measurable quality differences. Given certain assumptions, it offers statistical estimates of the value of differences in quality among heterogeneous goods and services.

The hedonic approach is a basic technique whereby the price (usually the log of the price) of a particular item is regressed on a set of statistically significant variables measuring its quality in every time period. The regression coefficients derived from the analysis are taken as implicit prices of the quality components. The Hedonic method was applied to the New Cars index and it was introduced in the HICP in December 2006.

The most suitable functional form to construct the hedonic model was found to be semi-logarithmic, whereby the log of the price is expressed as a function of a three explanatory variables, as shown below:

$$\ln P = b_0 + b_1 Engine + b_2 ABS + b_3 Saloon + e$$

The technique of ordinary least squares regression enables the estimation of the coefficients ($b_{0...3}$). These coefficients indicate the relative importance of the variables in explaining the variation in car prices over time.

Altogether 12 variables have been considered for the hedonic model, namely: Engine, BHP, ABS, Metallic, Diesel, Number of Doors, Saloon, Europe, Electric Windows, Petrol, Km / Gallon and Km / hr. However, the t-test proved that only the engine (cc), the ABS and the saloon variables were statistically significant at the 95% confidence interval. It should be noted that while the engine is a quantitative variable, the ABS and the saloon are qualitative ‘dummy’ variables taking the value of one if the car has the attribute (or pertains to that class of cars), zero otherwise.

The use of the *full* hedonic approach makes it possible to change both the functional form and the “implicit price” coefficients every month. In other words, the *full* hedonic based index is not stable over time. However, a standard set of weights corresponding to the total (in the case of the qualitative variables) or average (in the case of the quantitative variable) of each characteristic observed in the base period are applied to each attribute. This ensures that the calculated index numbers measure the movement in average prices for cars having the same proportion of characteristics as those being offered for sale in the base period. The index numbers themselves are computed by comparing the weighted prices in each period with the weighted average price in the base period as follows:

$$\ln P = b_0 + b_1 \cdot W_{Engine} + b_2 \cdot W_{ABS} + b_3 \cdot W_{Saloon}$$

W represents the weights, which are fixed over time. The methodology described above is used to produce weighted standardised car-price index numbers, whereby a weighted average of the estimated regression coefficients is calculated (each coefficient being regarded as an implicit price-characteristic).

3.6 ~ Closing Outlets

When a particular outlet ceases operations, interviewers replace it with a similar shop after the unit staff members ascertain that such an outlet fits the index requirements in terms of ranges and availability of items.

Chapter 4 ~ Methodological Issues

4.1 ~ Fixed-Base Index vs. Chain-Linked Index

One of the most controversial issues is whether to opt for Fixed-base indices or Chain-linked indices. As already stated, Article 9 of Council Regulation 2494/95 stipulates that the formula used for producing the HICP should be a Laspeyres-type index covering the categories of the COICOP international classification.

Up to the year 2005 the HICP was chain linked to 1996=100. In January 2006 the HICP reference period was changed to 2005=100.

Table 9 illustrates the marked advantages and disadvantages of 'Chain-linked indices'.

Table 9

Advantages	Disadvantages
More up-to-date and relevant weights	Ongoing Household Budgetary Survey can be costly
It is possible to review systematically the sample of locations, outlets and items each year	The systematic review of the basket and the HICP sampling framework implied by the 'Chain index' methodology can be resource intensive
Particularly suitable for quality adjustment and re-sampling through the systematic updates of the basket of goods and services	
In line with most new Member States' current practice (perceived as the best practice)	

It is believed that the advantages of the chain-linked index outweigh by far the disadvantages. This explains why a chain-linked index was adopted in the case of the HICP. However, the RPI is computed using a fixed-base formula.

4.2 ~ Computation of the Indices

The RPI is a fixed quantity price index - it measures the change in the price of a basket of fixed consumption, quantity and quality. This is generally expressed by saying that the RPI uses a fixed basket. The index I_t at time t is a Laspeyres-type or fixed base weight index, being the price of the basket at a given time expressed as a percentage of its price on the base date:

$$I_t = \frac{\sum P_{it} Q_{ib}}{\sum P_{ib} Q_{ib}} \times 100$$

where: P_{it} = price for the i^{th} item at time t ;
 P_{ib} = price for the i^{th} item in the base year;
 Q_{ib} = quantity of i^{th} item purchased in the base year.

Alternatively the above equation can be re-written as follows:

$$I_t = \frac{\sum (P_{it} Q_{ib}) w_i}{\sum w_i} \times 100$$

where: $w_i = P_{ib} Q_{ib}$

In plain, simple English, this is a weighted average of *price relative*³, the weight being the expenditure on item i in the base period.

The above explanation applies also to the HICP. The cardinal distinction between the two formulae is illustrated algebraically below.

The Laspeyres link is defined as follows:

$$P_t^{LC} = P_{t-1,1}^L = \frac{\sum p_t q_{t-1}}{\sum p_{t-1} q_{t-1}}$$

such that $P_{0t}^{LC} = P_1^{LC} \times \dots \times P_t^{LC}$ is the Laspeyres chain.

Needless to say, the application of the chain-index approach and the traditional direct approach to the same data yield different results. Also of note is the fact that the existence of a product representation of an index as such is not sufficient to characterise a chain index. This is apparent from a composition of the Laspeyres *chain* index which is:

$$P_{03}^{LC} = \sum \frac{p_1}{p_0} \times \frac{p_0 q_0}{\sum p_0 q_0} \times \sum \frac{p_2}{p_1} \times \frac{p_1 q_1}{\sum p_1 q_1} \times \sum \frac{p_3}{p_2} \times \frac{p_2 q_2}{\sum p_2 q_2}$$

with the *direct* Laspeyres index given by:

³ A 'price relative' is the ratio of a price in a particular period to the price for the same commodity in another period.

$$P_{03}^L = \sum \frac{p_1}{p_0} \times \frac{p_0 q_0}{\sum p_0 q_0} \times \sum \frac{p_2}{p_1} \times \frac{p_1 q_0}{\sum p_1 q_0} \times \sum \frac{p_3}{p_2} \times \frac{p_2 q_0}{\sum p_2 q_0} = \sum \frac{p_3}{p_0} \times \frac{p_0 q_0}{\sum p_0 q_0}$$

The difference between these two formulae is that in the latter approach, *only* prices are updated whereas in the Laspeyres chain index, *both* prices and quantities are updated continuously.