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**REVISIONS IN QUARTERLY GDP OF OECD COUNTRIES**

**This document has been prepared by Tommaso Di Fonzo, University of Padova - Italy**

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*WORKING PARTY ON NATIONAL ACCOUNTS*

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OECD WORKING PARTY ON NATIONAL ACCOUNTS

Revisions in quarterly GDP of OECD countries

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Meeting:  
11 – 14 October 2005

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## OECD Working Party on National Accounts, 11-14 October 2005

### REVISIONS IN QUARTERLY GDP OF OECD COUNTRIES

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#### Abstract

This paper examines the revisions histories of eighteen OECD countries. Specifically it analyses the size of revisions to the first estimates of constant prices, seasonally adjusted, quarter-on-quarter GDP growth rates as published on successive issues of *Main Economic Indicators* from May-95 to August-05 editions. With respect to earlier OECD studies, the analysis covers more countries (18 instead of 7), by exploiting a revisions database which is currently under construction at the OECD Statistics Directorate, and the paper encourages the development of revisions analysis databases in statistical offices that do not currently compile them. The considered countries are those for which the revisions record is long enough to permit sensible statistical analysis. The release time of the first published estimates of GDP, as shown by the OECD publications, and the size and direction of the revisions are described for each country, and comparisons across countries are performed. The paper concludes that both the timeliness of the publication on MEI and the reliability of estimates have improved for most countries. It shows also that the revisions for the considered period have been of similar magnitude for most countries, with some exceptions, like Japan, Korea and Portugal, where they have tended to be larger, and, to a minor extent, Belgium, Denmark, Finland, New Zealand and Norway. In most countries the size of successive revisions (1, 2 and 3 years after the first published estimate) becomes smaller. Finally, a test is conducted to check whether mean revisions are statistically different from zero. Evidences confirming this fact emerge for Canada, Denmark, France, Italy, Norway and United Kingdom.

#### 1. Introduction

This paper examines the revisions histories of eighteen OECD countries. Specifically it analyses the size of revisions to the first estimates of constant prices, seasonally adjusted quarter-on-quarter GDP growth rates as published on successive issues of *Main Economic Indicators* (MEI) from May-95 to August-05 editions.

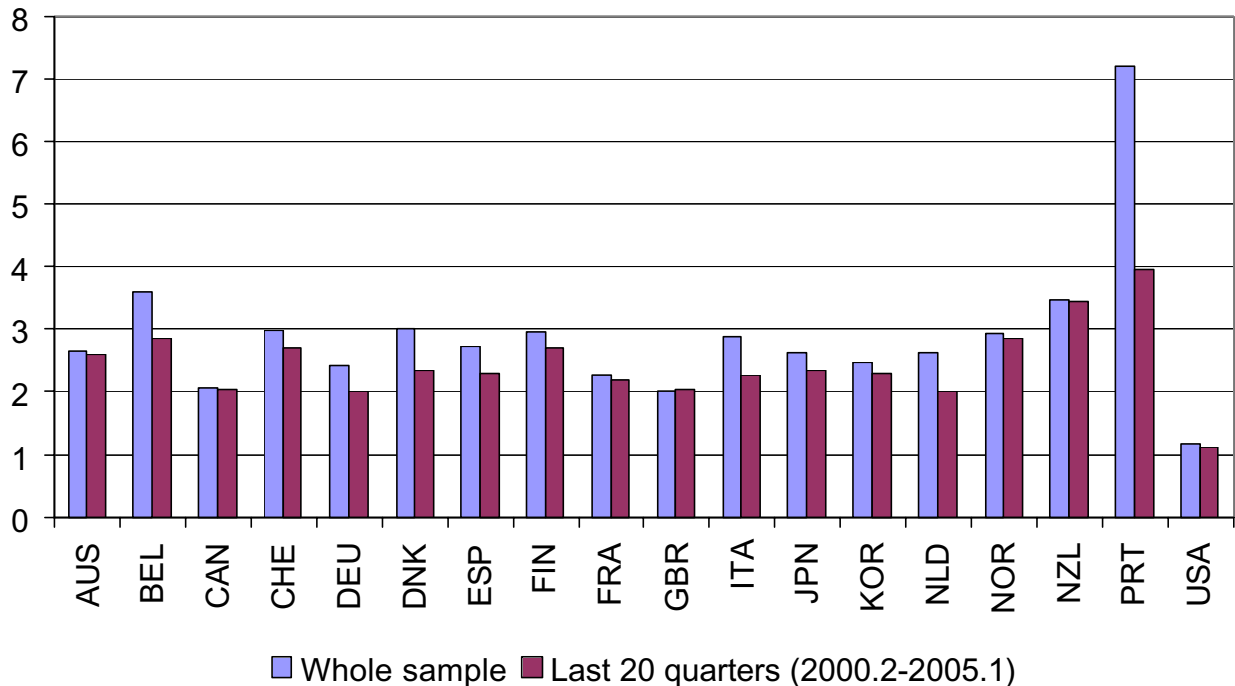
With respect to earlier OECD studies, the analysis covers more countries (18 instead of 7), by exploiting a revisions database which is currently under construction at the OECD Statistics Directorate, and the paper encourages the development of revisions analysis databases in statistical offices that do not currently compile them. The considered countries are those for which the revisions record is long enough to permit sensible statistical analysis. The available revisions database permits (i) to evaluate the release times of the first published estimates of GDP, as shown by the OECD publications, (ii) to analyse the size and direction of the revisions for each country, and (iii) to perform comparisons across countries.

The main results appear in the figures 1, 2 and 3. In figure 1 the average number of months between the date of publication on MEI of the first GDP estimate and the third month of the reference quarter is presented for both the whole period covered by the dataset and the last five years. The size of the revisions for each country in the last five years, as measured by the mean absolute revision, is in turn presented in figure 2, where the revisions to the first published estimates of GDP are considered, and in figure 3, where the ‘process’ of revision as described by successive estimates made twelve months later is represented in graphical form.

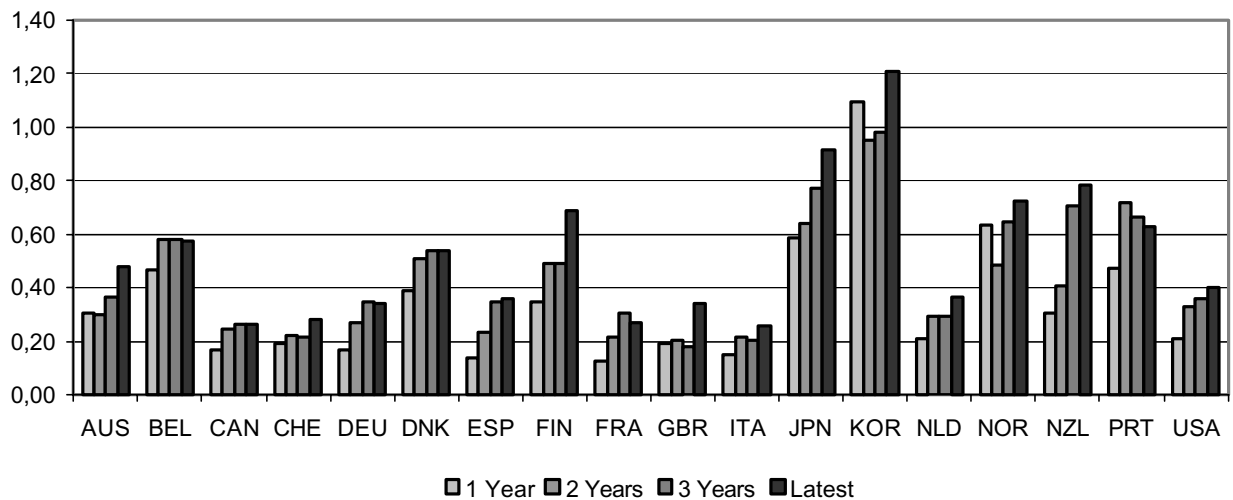
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\* I wish to thank Rachida Dkhissi and Ugo Hernandez for their collaboration in collecting the data and in organizing the revisions database.

**Figure 1: Average number of months between the date of publication of GDP on MEI and the third month of the reference quarter**



**Figure 2: Revisions to the first published estimates of q-o-q GDP growth rates (%) on MEI. Mean absolute revision (1997.2-2002.1)\***



\* NOR and PRT: 1997.1-2001.4.

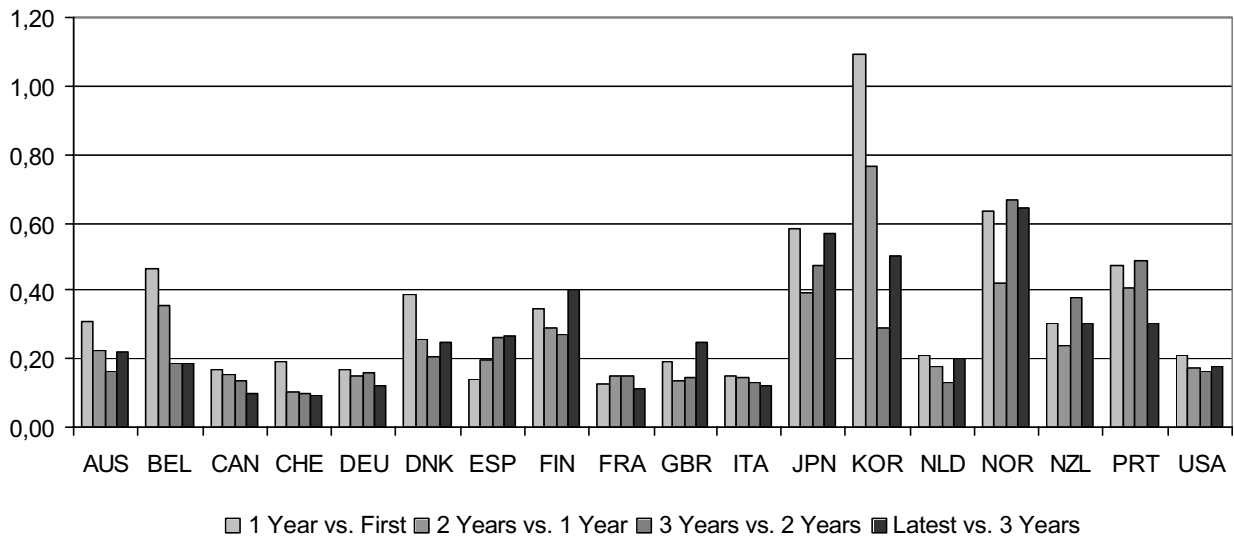
While we refer to earlier OECD works<sup>1</sup> (and references therein) for other important revisions issues (e.g. the role of revisions analysis when dealing with the accuracy and reliability dimension of data quality, the analysis of revisions as an approach to assessing statistical outputs in economic datasets, the issue of how to present the revisions to the public<sup>2</sup>), in this paper we present quantitative and

<sup>1</sup> See Ahmad *et al.* (2004) and Di Fonzo (2005).

<sup>2</sup> A very interesting, recent contribution, not previously quoted in the OECD works, is George and Obuwa (2005).

graphical evidences coming from the QNA-MEI revisions database, which permit to reach interesting conclusions on the way in which the revision process of the economic variable of interest (quarter-on-quarter constant prices GDP, seasonally adjusted, in this case) has evolved in time, possibly signaling problematic areas on which the data producer must concentrate her/his efforts.

**Figure 3: Revisions to successive estimates of q-o-q GDP growth rates (%). Mean absolute revision (1997.2-2002.1)\***



\* NOR and PRT: 1997.1-2001.4.

The paper is organized as follows. In the next section we discuss some practical data issues about the collection of data and the organization of the QNA-MEI GDP revisions database. By using this information, we analyze the release times of the first published estimates of GDP on MEI (section 3). At this regard, it should be stressed that, rather than the actual countries' timeliness in releasing GDP, we present the 'QNA-MEI view' on this issue, where the true timeliness is 'filtered' through the publication practices adopted by OECD in the last decade. Section 4 shows the summary indices used to analyze the revisions, which are presented and briefly commented out in section 5, in the form of comparisons across countries. More detailed information on the revision process for each country is in turn available in the statistical annex to this paper.

## 2. The QNA-MEI revisions dataset for GDP

Due to unsynchronised national release policies, the OECD publishes both timely data on key macroeconomic variables (e.g. Quarterly National Accounts series) and revised versions of the same time series. In other words, almost all published variables are first released on a preliminary basis to satisfy the users' need for timely information, and are then revised at a later period to incorporate information that was not available at the time of the preliminary release.

Coverage problems and different revision practices across countries and across statistical indicators give rise to a revision process which is generally characterized by a preliminary (or provisional) estimate and by a subsequent series of routinely produced<sup>3</sup> revisions, that follow closely upon one another.

<sup>3</sup> It should be noted that, from time to time, additional, more unusual revisions could also occur, which take place at

A comprehensive analysis of revisions requires considerable time and resources. It would encompass the full set of published data, ideally including both raw and seasonally adjusted data, and, where it is the case, in both current and constant prices. Growth rates as well as levels would be analyzed<sup>4</sup> and a complete documentation about the revisions themselves and about the reasons why they were necessary would be collected and investigated.

The ongoing OECD project on revisions analysis assumes these indications in building a real-time dataset for revisions analysis coming from the OECD monthly publication *Main Economic Indicators* (MEI).

The main characteristics of MEI can be summarized as follows:

- MEI is published in paper format since the early 1960's.
- The collection of the successive editions provides long time series for key short-term economic statistics for most OECD countries, e.g.:
  - Quarterly GDP and expenditure components
  - Indices of industrial production & Composite Leading Indicators
  - Retail Trade, Consumer and Producer Prices
  - Wages, employment and unemployment
  - Interest rates, exchange rates, monetary aggregates
  - Business tendency and consumer opinion surveys
  - International trade and international finance
  - Balance of payments
- In particular, the MEI database has time series going back until the late 1950's and early 1960's for several of the larger OECD countries for many key economic variables. Electronic monthly 'snapshot' databases are available in user friendly format back until February 1999 at least until 1995.
- The MEI has been published as a CD Rom for many years. The Statistics Directorate of OECD has established a catalogue of these back until February 1999, from which it plans to construct real time database for several of the variables listed above in the near future, and is in the process of trying to retrieve earlier information saved to disks back to the 1980's.

MEI monthly snapshots in principle provide historical data on subsequent releases on a wide range of key variables. They therefore provide a coherent set of variables representing the 'information set' available at successive monthly intervals. It should be noted that a monthly snapshot is most likely frequent enough to pick up all releases of economic statistics as they are seldom revised twice within one month – although there are likely to be some exceptions.

## 2.1. OECD interest in a revisions database

The OECD-ONS workshop<sup>5</sup> of October 2004 has been a major step forward for promoting the construction of real time databases and revisions analysis across OECD countries. Three key outcomes from the conference were:

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infrequent and irregular intervals. These 'extraordinary' revisions can include changes in concepts and definitions of the aggregates and/or information coming from decennial censuses and improved estimation procedures.

<sup>4</sup> Even if it is generally agreed that the main concern of users is much more on growth rates than on levels.

<sup>5</sup> [http://www.oecd.org/document/23/0,2340,fr\\_2825\\_495684\\_33729303\\_1\\_1\\_1\\_1,00.html](http://www.oecd.org/document/23/0,2340,fr_2825_495684_33729303_1_1_1_1,00.html).

- Systematic archiving of all vintages of data is key for revisions analysis.
- Revisions analysis should be seen as an integral part of the statistical production process.
- OECD would explore the possibility of maintaining and expanding a revisions database for the expenditure components of quarterly GDP.

These efforts should be finalized in terms of statistical analysis of the revisions process, to give answers to questions like: Are revisions random (i.e. centred around 0)? Are they in general becoming smaller? Moreover, they can support internationally coordinated research work to improve the quality of early estimation methods, encourage transparency in the statistical process and assess real-time performance of the OECD Composite Leading Indicators (Di Fonzo, 2005).

## 2.2. Data issues

The initial OECD work (Ahmad *et al.*, 2004) was for GDP of G7 countries in the period 1996 – 2000. After that, further work has been done to expand the analysis to all OECD countries and to cover a longer time period.

An obstacle encountered during this phase of the work has been the existence of gaps in the electronic sources<sup>6</sup>, which could be filled only by resorting to paper copies. Other problems have an operational nature (e.g. series code changes) or pertain to methodological issues, such as the constancy of national series over time (e.g. various methodological changes causing breaks and revisions), and the OECD procedures (e.g. linking, seasonal adjustment)<sup>7</sup>. Finally, also data management problems should be taken into account, because the data collection phase produces big databases.

In this paper revision is defined as the difference between a later (more recent) estimate and an earlier estimate. This is often expressed as ‘Later minus Preliminary’, and written as  $L-P$ . On the other hand, in the past Eurostat and the OECD have used  $P-L$ . When calculating the mean revision, this results in an estimate with the opposite sign to that of a revision. For this reason, in the OECD-ONS workshop of October 2004 it was agreed that if an organization chooses to use  $P-L$  then they should not use the phrase ‘revision’ but ‘deviance’ or ‘error’ or some other term.

There is some inconsistency between practitioners in the use of terms such as ‘latest’ and ‘final’. For example, for quarterly GDP estimates, some countries use the term final to distinguish between ‘firm’ quarterly estimates (generally published around 90 days after the end of the quarter in question) and preliminary or flash estimates (published much more quickly). Other countries take the view that whilst there is a possibility that an estimate could be revised due to methodological improvements or re-basing, the estimates can never be considered as final.

In the context of our datasets, it was decided to use the term ‘latest’, which has been used to denote the ‘latest available estimate of GDP published on MEI at least 36 months after the first published estimate’. The revision process is evaluated at 1, 2 and 3 years after the first published estimate (the corresponding estimates are labelled as  $Y_1$ ,  $Y_2$  and  $Y_3$ , respectively). In the earlier OECD analysis (Ahmad *et al.*, 2004) the successive revisions between  $P$  (the first published estimate on MEI) and  $L$  (the latest estimate) are considered as the values published on MEI of December for the years  $t+1$ ,  $t+2$

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<sup>6</sup> The first electronic source available on a current basis for MEI refers to May-95 edition, whose data has been distributed by OECD on a floppy disk.

<sup>7</sup> Methodological issues can also affect the validity of assessing revisions. For example, revisions caused by statistical processes e.g. changing response rate, data editing, changes to estimation methods, benchmarking etc., may need to be considered very differently to revisions caused by other changes such as scope, definitions (e.g. SNA 93) etc. Hence it’s a very resource intensive process to establish a historical real time database for each variable.

and  $t+3$  ( $D1$ ,  $D2$  and  $D3$ , respectively), where  $t$  denotes the year to which the reference quarter belongs. In what follows, due to space reason, only  $Y1$ ,  $Y2$  and  $Y3$  will be considered, while in the statistical annex also  $D1$ ,  $D2$  and  $D3$  are analyzed.

Table 1 presents the current data availability for GDP in the QNA-MEI revisions database. A more detailed picture, referred to all possible versions (current/constant prices, seasonally adjusted/raw) of GDP in the database can be found in the appendix (table A1).

**Table 1: Data availability for GDP (constant prices, seasonally adjusted) in the QNA-MEI revisions database. Period under review: MEI published in May 1995 – August 2005.**

MEI editions		Vintages			Countries
First	Last	First	Last	#	
May-95	Aug-05	95q1	05q2	124	1: USA
May-95	Aug-05	94q4	05q1	124	13: AUS, CAN, CHE, DNK, ESP, FIN, FRA, GBR, ITA, JPN, NLD, NOR, NZL
Nov-95	Aug-05	95q2	05q1	118	1: DEU
Nov-96	Aug-05	95q4	05q1	106	1: PRT
Mar-97	Aug-05	96q3	05q2	102	1: BEL
May-97	Aug-05	96q4	05q2	100	1: KOR
Oct-03	Aug-05	03q2	05q1	23	1: CZE*
Nov-03	Aug-05	03q2	05q1	22	1: AUT*
Apr-04	Aug-05	03q4	05q1	17	1: GRC
Nov-04	Aug-05	04q2	04q4	10	1: IRL
Aug-05	Aug-05	05q1	05q1	2	1: HUN
May-95	Sep-00	94q4	00q2	65	2: SWE, TUR
May-95	Sep-00	94q4	00q1	65	1: MEX
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\* Previously published vintages are not considered: CZE: 99q1 from MEI July-99 to 00q1 from MEI Sep-00; AUT: 94q4 from MEI May-95 to 00q1 from MEI Sep-00.

As it is clear from table 1, for the time being sensible revisions analyses can be conducted only for 18 countries over 30, that is where at least 100 successive vintages of data are available. Thus in the rest of the paper we will focus on the revisions to GDP (q-o-q rates of changes, seasonally adjusted) for the following countries: Australia, Belgium, Canada, Denmark, Finland, France, Germany, Italy, Japan, Korea, Netherlands, New Zealand, Norway, Portugal, Spain, Switzerland, United Kingdom and USA.

In order to avoid spurious comparisons and to deal with an homogeneous revisions dataset<sup>8</sup>, in the following the first published 95q1 estimate will be considered as the starting point of the revisions analysis for 14 countries (the above 13 and USA)<sup>9</sup> over 18. For similar reasons the analyses involving Portugal, Belgium and Korea will be conducted using the first published estimates for 96q1, 96q4 and 97q1, respectively. The starting quarter for the revisions analysis of German GDP will be in turn 95q2<sup>10</sup>.

<sup>8</sup> The estimates of GDP for 94q4 published in the May-95 edition of MEI are true ‘first published estimates’ for only 5 countries over 13, and precisely: Australia, Denmark, France, Italy, Netherlands. For the remaining 8 countries (Canada, Finland, Japan, New Zealand, Norway, Spain, Switzerland, United Kingdom) an estimate of GDP in 94q4 was published earlier on MEI April-95. Furthermore, on MEI April-95, the published 94q4 estimates of GDP for Finland and Norway are not seasonally adjusted. In the same edition, for New Zealand an index number for the ‘Real Domestic Product’ (seasonally adjusted, base 1990=100) has been published for 94q4.

<sup>9</sup> The 95q1 estimate of the USA GDP has been published for the first time on the May-95 edition of MEI.

<sup>10</sup> Other data issues raised from Portugal, where the December $t+1$  series is incomplete because no GDP data for 1999 was

## 2.3. Organization of the database

Following the ONS experience (Jenkinson and George, 2005), the data have been organized in databases suited for the revisions analysis. Using the Canadian GDP dataset as an example, the database of GDP in levels (table 2) is used to obtain the QoQ rates of change (table 3), based on which the revisions triangle (table 4) is calculated, from which the revisions spreadsheet is immediately extracted (table 5).

**Table 2: An excerpt from the QNA-MEI revisions database: level estimates**

### Revisions QNA-MEI dataset (OECD)

#### CANADA, Gross Domestic Product (constant prices, seasonally adjusted)

#### Levels

CAN		1994 Q3	1994 Q4	1995 Q1	1995 Q2	1995 Q3	1995 Q4	1996 Q1	1996 Q2	1996 Q3	1996 Q4	1997 Q1	1997 Q2	1997 Q3	1997 Q4	1998 Q1	1998 Q2	1998 Q3	1998 Q4	1999 Q1	1999 Q2	
unit	level	Latest estimate	817.5	824.8	832.5	832.5	832.6	836.3	837.4	840.7	850.6	859.1	867.5	877.5	889.2	896.9	908.3	910.7	920.7	935.9	950.6	961.7
1986 Can\$ bln	AR	May-95	600.5	609.2																		
1986 Can\$ bln	AR	Jun-95	600.5	609.2																		
1986 Can\$ bln	AR	Jul-95	602.5	609.3	610.4																	
1986 Can\$ bln	AR	Aug-95	602.5	609.4	610.4																	
1986 Can\$ bln	AR	Sep-95	602.5	609.3	610.7	609.1																
1986 Can\$ bln	AR	Oct-95	602.5	609.3	610.7	609.1																
1986 Can\$ bln	AR	Nov-95	602.5	609.3	610.7	609.1																
1986 Can\$ bln	AR	Dec-95	602.5	609.3	611.4	610.5	613.6															
1986 Can\$ bln	AR	Jan-96	602.5	609.3	611.4	610.5	613.6															
1986 Can\$ bln	AR	Feb-96	602.5	609.3	611.4	610.5	613.6															
1986 Can\$ bln	AR	Mar-96	602.5	609.3	611.0	609.7	611.6	612.9														
1986 Can\$ bln	AR	Apr-96	602.5	609.4	611.0	609.7	611.6	612.9														
1986 Can\$ bln	AR	May-96	602.5	609.4	611.0	609.7	611.6	612.9														
1986 Can\$ bln	AR	Jun-96	598.9	606.3	608.7	607.2	609.0	610.4	612.2													
1986 Can\$ bln	AR	Jul-96	598.9	606.3	608.7	607.2	609.0	610.4	612.2													
1986 Can\$ bln	AR	Aug-96	598.9	606.3	608.7	607.2	609.0	610.4	612.2													
1986 Can\$ bln	AR	Sep-96	598.9	606.3	608.7	607.2	609.0	610.4	612.4	614.4												
1986 Can\$ bln	AR	Oct-96	598.9	606.3	608.7	607.2	609.0	610.4	612.4	614.4												
1986 Can\$ bln	AR	Nov-96	598.9	606.3	608.7	607.2	609.0	610.4	612.4	614.4												
1986 Can\$ bln	AR	Dec-96	598.9	606.3	608.7	607.2	609.0	610.4	612.0	613.9	618.9											
1986 Can\$ bln	AR	Jan-97	598.9	606.3	608.7	607.2	609.0	610.4	612.0	613.9	618.9											
1986 Can\$ bln	AR	Feb-97	598.9	606.3	608.7	607.2	609.0	610.4	612.0	613.9	618.9											
1986 Can\$ bln	AR	Mar-97	598.9	606.3	608.7	607.2	609.0	610.4	612.5	614.7	619.8	624.2										
1986 Can\$ bln	AR	Apr-97	598.9	606.3	608.7	607.2	609.0	610.4	612.5	614.7	619.8	624.2										
1986 Can\$ bln	AR	May-97	598.9	606.3	608.7	607.2	609.0	610.4	612.5	614.7	619.8	624.2										
1986 Can\$ bln	AR	Jun-97	598.9	606.3	608.7	607.2	609.0	610.4	612.5	614.7	619.8	624.2	629.5									
1986 Can\$ bln	AR	Jul-97	598.9	606.3	608.7	607.2	609.0	610.4	612.5	614.7	619.8	624.2	629.5									
1986 Can\$ bln	AR	Aug-97	598.9	606.3	608.7	607.2	609.0	610.4	612.5	614.7	619.8	624.2	629.5									
1986 Can\$ bln	AR	Sep-97	598.9	606.3	608.7	607.2	609.0	610.4	612.5	614.7	619.8	624.2	629.9	637.6								
1986 Can\$ bln	AR	Oct-97	598.9	606.3	608.7	607.2	609.0	610.4	612.5	614.7	619.8	624.2	629.9	637.6								
1986 Can\$ bln	AR	Nov-97	598.9	606.3	608.7	607.2	609.0	610.4	612.5	614.7	619.8	624.2	629.9	637.6								
1986 Can\$ bln	AR	Dec-97	598.9	606.3	608.7	607.2	609.0	610.4	612.5	614.7	619.8	624.2	629.9	637.6								
1992 Can\$ bln	AR	Jan-98	749.7	756.6	760.3	758.7	759.9	762.4	763.6	765.1	772.8	777.4	785.3	795.7	803.8							
1992 Can\$ bln	AR	Feb-98	749.7	756.6	760.3	758.7	759.9	762.4	763.6	765.1	772.8	777.4	785.3	795.7	803.8							
1992 Can\$ bln	AR	Mar-98	749.7	756.6	760.3	758.7	759.9	762.4	763.6	765.1	772.8	777.4	786.4	796.3	804.0	809.9						
1992 Can\$ bln	AR	Apr-98	749.7	756.6	760.3	758.7	759.9	762.4	763.6	765.1	772.8	777.4	786.4	796.3	804.0	809.9						
1992 Can\$ bln	AR	May-98	749.7	756.6	760.3	758.7	759.9	762.4	763.6	765.1	772.8	777.4	786.4	796.3	804.0	809.9						
1992 Can\$ bln	AR	Jun-98	749.7	756.6	760.3	758.7	759.9	762.4	763.6	765.1	772.8	777.4	786.5	794.6	803.0	808.6	816.0					
1992 Can\$ bln	AR	Jul-98	749.7	756.6	760.3	758.7	759.9	762.4	763.6	765.1	772.8	777.4	786.5	794.6	803.0	808.6	816.0					
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1992 Can\$ bln	AR	Sep-98	749.7	756.6	760.3	758.7	759.9	762.4	763.6	765.1	772.8	777.4	786.5	794.6	803.0	808.6	815.4	819.0				
1992 Can\$ bln	AR	Oct-98	749.7	756.6	760.3	758.7	759.9	762.4	763.6	765.1	772.8	777.4	786.5	794.6	803.0	808.6	815.4	819.0				
1992 Can\$ bln	AR	Nov-98	749.7	756.6	760.3	758.7	759.9	762.4	763.6	765.1	772.8	777.4	786.5	794.6	803.0	808.6	815.4	819.0				
1992 Can\$ bln	AR	Dec-98	754.6	761.6	767.2	766.8	767.6	770.0	772.4	773.6	779.1	783.5	793.4	803.5	812.2	817.9	824.0	827.0	830.7			
1992 Can\$ bln	AR	Jan-99	754.6	761.6	767.2	766.8	767.6	770.0	772.4	773.6	779.1	783.5	793.4	803.5	812.2	817.9	824.0	827.0	830.7			
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1992 Can\$ bln	AR	Mar-99	754.6	761.6	767.2	766.8	767.6	770.0	772.4	773.6	779.1	783.5	793.4	803.5	812.2	817.9	824.4	827.5	831.1	840.4		
1992 Can\$ bln	AR	Apr-99	754.6	761.6	767.2	766.8	767.6	770.0	772.4	773.6	779.1	783.5	793.4	803.5	812.2	817.9	824.4	827.5	831.1	840.4		
1992 Can\$ bln	AR	May-99	754.6	761.6	767.2	766.8	767.6	770.0	772.4	773.6	779.1	783.5	793.4	803.5	812.2	817.9	824.4	827.5	831.1	840.4		
1992 Can\$ bln	AR	Jun-99	754.6	761.6	767.2	766.8	767.6	770.0	772.4	773.6	779.1	783.5	793.4	803.5	812.2	817.9	824.4	827.5	831.1	840.4		
1992 Can\$ bln	AR	Jul-99	754.6	761.6	767.9	767.2	768.8	772.4	774.3	777.5	785.6	791.2	799.3	807.8	819.3	825.8	831.5	833.7	839.0	848.9	857.7	
1992 Can\$ bln	AR	Aug-99	754.6	761.6	767.9	767.2	768.8	772.4	774.3	777.5	785.6	791.2	799.3	807.8	819.3	825.8	831.5	833.7	839.0	848.9	857.7	
1992 Can\$ bln	AR	Sep-99	754.6	761.6	767.9	767.2	768.8	772.4	774.3	777.5	785.6	791.2	799.3	807.8	819.3	825.8	831.5	833.7	839.0	848.9	857.7	864.8

published on MEI Dec-00, and from Norway, whose December  $t+3$  series is incomplete due to the fact that no value for the 98q4 GDP was published on MEI Dec-02, so that the 99q1 quarter-on-quarter growth rate cannot be calculated.

Table 3: An excerpt from the QNA-MEI revisions database: quarter-on-quarter growth rates

## Revisions QNA-MEI dataset (OECD)

## CANADA, Gross Domestic Product (constant prices, seasonally adjusted)

## QoQ rates of changes (%)

Relating to period	1994 Q4	1995 Q1	1995 Q2	1995 Q3	1995 Q4	1996 Q1	1996 Q2	1996 Q3	1996 Q4	1997 Q1	1997 Q2	1997 Q3	1997 Q4	1998 Q1	1998 Q2	1998 Q3	1998 Q4	1999 Q1	1999 Q2
First estimate	1,4	0,2	-0,3	0,5	0,2	0,3	0,3	0,8	0,7	0,8	1,2	1,0	0,7	0,9	0,4	0,4	1,1	1,0	0,8
December t+1	1,1	0,4	-0,3	0,3	0,2	0,3	0,4	0,8	0,7	1,3	1,3	1,1	0,7	0,7	0,3	0,6	1,2	1,2	0,8
December t+2	1,2	0,4	-0,3	0,3	0,2	0,3	0,2	0,7	0,6	1,0	1,1	1,4	0,8	0,7	0,3	0,7	1,5	1,6	0,7
December t+3	1,2	0,7	0,0	0,1	0,3	0,3	0,4	1,0	0,7	1,2	1,2	1,4	0,9	1,0	0,4	1,1	1,6	1,5	1,1
1 year later	1,1	0,4	-0,3	0,3	0,2	0,3	0,4	0,8	0,6	1,2	1,0	1,1	0,7	0,8	0,3	0,6	1,2	1,2	0,8
2 years later	1,2	0,4	-0,3	0,3	0,3	0,2	0,2	0,7	0,6	1,3	1,1	1,4	0,8	0,7	0,3	0,7	1,5	1,6	0,7
3 years later	0,9	0,5	-0,2	0,1	0,3	0,3	0,4	1,0	0,7	1,2	1,2	1,4	0,9	0,7	0,4	1,1	1,6	1,5	1,1
Latest estimate	0,9	0,9	0,0	0,0	0,4	0,1	0,4	1,2	1,0	1,0	1,2	1,3	0,9	1,3	0,3	1,1	1,7	1,6	1,2
May-95	1,4																		
Jun-95	1,4																		
Jul-95	1,1	0,2																	
Aug-95	1,1	0,2																	
Sep-95	1,1	0,2	-0,3																
Oct-95	1,1	0,2	-0,3																
Nov-95	1,1	0,2	-0,3																
Dec-95	1,1	0,3	-0,2	0,5															
Jan-96	1,1	0,3	-0,2	0,5															
Feb-96	1,1	0,3	-0,2	0,5															
Mar-96	1,1	0,3	-0,2	0,3	0,2														
Apr-96	1,1	0,3	-0,2	0,3	0,2														
May-96	1,1	0,3	-0,2	0,3	0,2														
Jun-96	1,2	0,4	-0,3	0,3	0,2	0,3													
Jul-96	1,2	0,4	-0,3	0,3	0,2	0,3													
Aug-96	1,2	0,4	-0,3	0,3	0,2	0,3													
Sep-96	1,2	0,4	-0,3	0,3	0,2	0,3	0,3												
Oct-96	1,2	0,4	-0,3	0,3	0,2	0,3	0,3												
Nov-96	1,2	0,4	-0,3	0,3	0,2	0,3	0,3												
Dec-96	1,2	0,4	-0,3	0,3	0,2	0,3	0,3	0,8											
Jan-97	1,2	0,4	-0,3	0,3	0,2	0,3	0,3	0,8											
Feb-97	1,2	0,4	-0,3	0,3	0,2	0,3	0,3	0,8											
Mar-97	1,2	0,4	-0,3	0,3	0,2	0,3	0,4	0,8	0,7										
Apr-97	1,2	0,4	-0,3	0,3	0,2	0,3	0,4	0,8	0,7										
May-97	1,2	0,4	-0,3	0,3	0,2	0,3	0,4	0,8	0,7										
Jun-97	1,2	0,4	-0,3	0,3	0,2	0,3	0,4	0,8	0,7	0,8									
Jul-97	1,2	0,4	-0,3	0,3	0,2	0,3	0,4	0,8	0,7	0,8									
Aug-97	1,2	0,4	-0,3	0,3	0,2	0,3	0,4	0,8	0,7	0,8									
Sep-97	1,2	0,4	-0,3	0,3	0,2	0,3	0,4	0,8	0,7	0,9	1,2								
Oct-97	1,2	0,4	-0,3	0,3	0,2	0,3	0,4	0,8	0,7	0,9	1,2								
Nov-97	1,2	0,4	-0,3	0,3	0,2	0,3	0,4	0,8	0,7	0,9	1,2								
Dec-97	1,2	0,4	-0,3	0,3	0,2	0,3	0,4	0,8	0,7	0,9	1,2								
Jan-98	0,9	0,5	-0,2	0,2	0,3	0,2	0,2	1,0	0,6	1,0	1,3	1,0							
Feb-98	0,9	0,5	-0,2	0,2	0,3	0,2	0,2	1,0	0,6	1,0	1,3	1,0							
Mar-98	0,9	0,5	-0,2	0,2	0,3	0,2	0,2	1,0	0,6	1,1	1,3	1,0	0,7						
Apr-98	0,9	0,5	-0,2	0,2	0,3	0,2	0,2	1,0	0,6	1,1	1,3	1,0	0,7						
May-98	0,9	0,5	-0,2	0,2	0,3	0,2	0,2	1,0	0,6	1,1	1,3	1,0	0,7						
Jun-98	0,9	0,5	-0,2	0,2	0,3	0,2	0,2	1,0	0,6	1,2	1,0	1,1	0,7	0,9					
Jul-98	0,9	0,5	-0,2	0,2	0,3	0,2	0,2	1,0	0,6	1,2	1,0	1,1	0,7	0,9					
Aug-98	0,9	0,5	-0,2	0,2	0,3	0,2	0,2	1,0	0,6	1,2	1,0	1,1	0,7	0,9					
Sep-98	0,9	0,5	-0,2	0,2	0,3	0,2	0,2	1,0	0,6	1,2	1,0	1,1	0,7	0,8	0,4				
Oct-98	0,9	0,5	-0,2	0,2	0,3	0,2	0,2	1,0	0,6	1,2	1,0	1,1	0,7	0,8	0,4				
Nov-98	0,9	0,5	-0,2	0,2	0,3	0,2	0,2	1,0	0,6	1,2	1,0	1,1	0,7	0,8	0,4				
Dec-98	0,9	0,7	0,0	0,1	0,3	0,3	0,2	0,7	0,6	1,3	1,3	1,1	0,7	0,8	0,4	0,4			
Jan-99	0,9	0,7	0,0	0,1	0,3	0,3	0,2	0,7	0,6	1,3	1,3	1,1	0,7	0,8	0,4	0,4			
Feb-99	0,9	0,7	0,0	0,1	0,3	0,3	0,2	0,7	0,6	1,3	1,3	1,1	0,7	0,8	0,4	0,4			
Mar-99	0,9	0,7	0,0	0,1	0,3	0,3	0,2	0,7	0,6	1,3	1,3	1,1	0,7	0,8	0,4	0,4	1,1		
Apr-99	0,9	0,7	0,0	0,1	0,3	0,3	0,2	0,7	0,6	1,3	1,3	1,1	0,7	0,8	0,4	0,4	1,1		
May-99	0,9	0,7	0,0	0,1	0,3	0,3	0,2	0,7	0,6	1,3	1,3	1,1	0,7	0,8	0,4	0,4	1,1		
Jun-99	0,9	0,7	0,0	0,1	0,3	0,3	0,2	0,7	0,6	1,3	1,3	1,1	0,7	0,8	0,4	0,4	1,1		
Jul-99	0,9	0,8	-0,1	0,2	0,5	0,3	0,4	1,0	0,7	1,0	1,1	1,4	0,8	0,7	0,3	0,6	1,2	1,0	
Aug-99	0,9	0,8	-0,1	0,2	0,5	0,3	0,4	1,0	0,7	1,0	1,1	1,4	0,8	0,7	0,3	0,6	1,2	1,0	
Sep-99	0,9	0,8	-0,1	0,2	0,5	0,3	0,4	1,0	0,7	1,0	1,1	1,4	0,8	0,7	0,3	0,6	1,2	1,0	0,8





The revisions spreadsheet may finally be used to calculate summary statistics on revisions for various comparisons<sup>11</sup>, as shown in table 6.

**Table 6: An excerpt from the QNA-MEI revisions database. Summary statistics for various comparisons**

**Canada, Gross Domestic Product (constant prices, seasonally adjusted)  
Common sample**

<i>Summary statistics</i>	<i>Comparisons</i>						
	Y1_P	Y2_P	Y3_P	L_P	Y2_Y1	Y3_Y2	L_Y3
<b>sample</b>	95.1-02.1	95.1-02.1	95.1-02.1	95.1-02.1	95.1-02.1	95.1-02.1	95.1-02.1
<b>n</b>	29	29	29	29	29	29	29
<b>mean absolute revision</b>	0,1497	0,2196	0,2357	0,2757	0,1309	0,1379	0,1249
<b>mean revision (Rbar)</b>	-0,0008	0,0493	0,1413	0,1760	0,0500	0,0920	0,0347
<b>st. dev(Rbar) - HAC formula</b>	0,0393	0,0458	0,0499	0,0567	0,0323	0,0324	0,0298
<b>mean squared revision</b>	0,0478	0,0672	0,0837	0,1113	0,0273	0,0342	0,0324
<b>relative mean absolute revision</b>	0,2103	0,2869	0,2766	0,3158	0,1710	0,1619	0,1431
<b>t-stat</b>	-0,0194	1,0764	2,8321	3,1028	1,5484	2,8364	1,1650
<b>t-crit</b>	2,0484	2,0484	2,0484	2,0484	2,0484	2,0484	2,0484
<b>Is mean revision significant?</b>	NO	NO	<b>YES</b>	<b>YES</b>	NO	<b>YES</b>	NO
<b>Correlation</b>	0,8861	0,8630	0,8748	0,8472	0,9500	0,9516	0,9441
<b>Min Revision</b>	-0,7	-0,5	-0,4	-0,5	-0,2	-0,2	-0,2
<b>Max Revision</b>	0,4	0,5	0,7	0,8	0,4	0,4	0,6
<b>Range</b>	1,1	1,0	1,1	1,3	0,6	0,6	0,8
<b>% Later &gt; Earlier</b>	62,1	55,2	75,9	72,4	55,2	72,4	48,3
<b>% Sign(Later) = Sign(Earlier)</b>	96,6	96,6	96,6	93,1	100,0	100,0	96,6
<b>Variance of Later estimate</b>	0,2166	0,2530	0,2715	0,2844	0,2530	0,2715	0,2844
<b>Variance of Earlier estimate</b>	0,2010	0,2010	0,2010	0,2010	0,2166	0,2530	0,2715
<b>UM %</b>	0,00	3,61	23,85	27,83	9,16	24,78	3,71
<b>UR %</b>	2,70	0,30	0,07	0,01	0,57	0,15	0,95
<b>UD %</b>	97,29	96,08	76,09	72,16	90,27	75,07	95,34

**Legenda**

P: First published estimate

L: Latest published estimate (at least 3 years after the first)

Y1: Estimate published 1 year later

Y2: Estimate published 2 years later

Y3: Estimate published 3 years later

### 3. Release time on MEI

In table 7 we present summary information about the time elapsed between the third month of the quarter of interest and the month of publication of the first published estimate of GDP (see also figure 1). Both the whole sample and the last (common) 20 observations are considered, in order to appreciate possible changes in the release time of GDP on MEI. The detailed information on which table 7 is based is presented in appendix (table A2).

Notice that MEI is commonly published during the first week of the month<sup>12</sup>. Due to this fact, and to the different release timing across countries (on this point see, for example, Ahmad *et al.*, 2004), the picture given by table 7 (and by figure 1) could be misleading if used to judge the timeliness of each country *per se*. Rather, table 7 offers the ‘QNA-MEI view’ on timeliness in the release of GDP, where

<sup>11</sup> Source data, revisions triangles, revisions spreadsheets and prospects of calculations of summary statistics on revisions for each country have been made available on the web site of the meeting.

<sup>12</sup> So, for example, for those countries whose GDP of 2005q1 has been published on MEI of May 2005, the release time has been assumed to be equal to 1 month, when GDP has been published on MEI of June 2005 it has been assumed equal to 2 months, and so on.

the true timeliness is ‘filtered’ through the publication practices adopted by OECD in the last decade<sup>13</sup>.

**Table 7: Summary statistics on release time of GDP. Number of months between the date of publication on MEI and the third month of the reference quarter**

**Whole sample**

	AUS	BEL	CAN	CHE	DEU	DNK	ESP	FIN	FRA	GBR	ITA	JPN	KOR	NLD	NOR	NZL	PRT	USA
<b>Mean</b>	2,66	3,60	2,07	2,98	2,43	3,02	2,73	2,95	2,27	2,02	2,90	2,61	2,47	2,61	2,93	3,46	7,22	1,17
<b>Median</b>	3	4	2	3	2	3	3	3	2	2	3	3	2	2	3	3	5	1
<b>Mode</b>	3	4	2	3	2	3	3	3	2	2	3	3	2	2	3	3	3	1
<b>Maximum</b>	4	8	3	4	5	5	5	4	4	3	6	3	6	5	7	9	22	4
<b>Minimum</b>	2	1	2	2	2	2	2	2	2	2	2	2	1	2	2	3	2	1
<b>Range</b>	2	7	1	2	3	3	3	2	2	1	4	1	5	3	5	6	20	3
<b>Std. Dev.</b>	0,57	1,57	0,26	0,56	0,63	0,87	0,73	0,49	0,50	0,15	0,88	0,49	0,81	1,01	1,02	1,13	4,85	0,53
<b>Sample</b>	95.1-05.1	96.4-05.2	95.1-05.1	95.1-05.1	95.2-05.1	95.1-05.1	95.1-05.1	95.1-05.1	95.1-05.1	95.1-05.1	95.1-05.1	95.1-05.1	97.1-05.2	95.1-05.1	95.1-05.1	95.1-05.1	96.1-05.1	95.1-05.2
<b>Observations</b>	41	35	41	41	40	41	41	41	41	41	41	41	34	41	41	41	37	42

**Common last 20 observations (2000.2-2005.1)**

	AUS	BEL	CAN	CHE	DEU	DNK	ESP	FIN	FRA	GBR	ITA	JPN	KOR	NLD	NOR	NZL	PRT	USA
<b>Mean</b>	2,60	2,85	2,05	2,70	2,00	2,35	2,30	2,70	2,20	2,05	2,25	2,35	2,30	2,00	2,85	3,45	3,95	1,10
<b>Median</b>	3	4	2	3	2	2	2	3	2	2	2	2	2	2	3	3	4	1
<b>Mode</b>	3	4	2	3	2	2	2	3	2	2	2	2	2	2	3	3	3	1
<b>Maximum</b>	3	4	3	4	2	3	3	3	3	3	3	3	3	2	5	9	7	2
<b>Minimum</b>	2	1	2	2	2	2	2	2	2	2	2	2	2	2	2	3	2	1
<b>Range</b>	1	3	1	2	0	1	1	1	1	1	1	1	1	0	3	6	5	1
<b>Std. Dev.</b>	0,49	1,24	0,22	0,56	0,00	0,48	0,46	0,46	0,40	0,22	0,43	0,48	0,46	0,00	0,65	1,43	1,20	0,30
<b>Observations</b>	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20

Having these *caveat* in mind, from figure 1 it clearly emerges that the time needed to publish GDP on MEI has generally improved: the average number of months between the month of publication on MEI and the third quarter of the reference quarter for the last (common) 20 quarters, that is for the period 2000q2-2005q1, is practically always less than in the whole sample. The only very minor exception was found for United Kingdom, whose first estimates of GDP have been always published on MEI two months after the end of the reference quarter, except for the 2002q2 value, published on MEI October-02 instead of, as expected, the month earlier as usual.

The most remarkable improvement has been registered for Portugal, which however presents the largest average (about 4 months) even in the more recent period. The only other country whose timeliness is stably over 3 month is New Zealand. The remaining countries are generally characterized by averages of 2 months (mostly in the last five years) or slightly more, the only exception being given by USA, which shows the best timeliness performance (about 1 month).

#### 4. Summary indices for the revisions analysis

The revisions to the earlier estimates of GDP q-o-q growth rates have been summarized using the following statistical indices:

- *Mean revision*

$$\bar{R} = \frac{1}{n} \sum_{t=1}^n (L_t - P_t) = \frac{1}{n} \sum_{t=1}^n R_t$$

<sup>13</sup> Faust *et al.* (2005) write on this point: “Although MEI is published monthly, we are not guaranteed that the first number published in MEI is really the first number ever released. Data for a given quarter is usually reported in MEI soon after the end of that quarter”.

where  $L_t$  is the later estimate,  $P_t$  is the earlier estimate,  $R_t = L_t - P_t$  is the revision and  $n$  is the number of observations.

- *Mean absolute revision*

$$MAR = \frac{1}{n} \sum_{t=1}^n |L_t - P_t| = \frac{1}{n} \sum_{t=1}^n |R_t|$$

- *Mean squared revision*

$$MSR = \frac{1}{n} \sum_{t=1}^n (L_t - P_t)^2 = \frac{1}{n} \sum_{t=1}^n R_t^2$$

The mean squared revision is a summary measure based on a symmetric and quadratic loss function. It has some properties, mainly an interesting decomposition, which are presented in Appendix A3.

Another indicator which has been generally kept into consideration in revisions analysis (see, for example, Ahmad *et al.*, 2004) is the *Relative mean absolute revision*, defined as

$$RMAR = \frac{\sum_{t=1}^n |L_t - P_t|}{\sum_{t=1}^n |L_t|} = \frac{\sum_{t=1}^n |R_t|}{\sum_{t=1}^n |L_t|}.$$

Less widely used, but potentially very useful are statistics on the range of revisions, on the amount of positive and negative revisions and on the number of times the signs of the earlier and of the later estimates coincide.

To conclude on this point, as far as the evaluation of the significance of the mean revision is concerned, a simple and robust approach based on the Heteroskedasticity Autocorrelation Consistent estimate's variance proposed by Newey and West (1987) can be considered. In this case the standard  $t$  test is applied using a robust estimate of the variance of the mean revision, which is calculated in a different way with respect to what is currently done by ONS (Jenkinson and Stuttard, 2004). Technical details on this point can be found in Di Fonzo (2005).

## 5. Revisions analysis of GDP for OECD countries

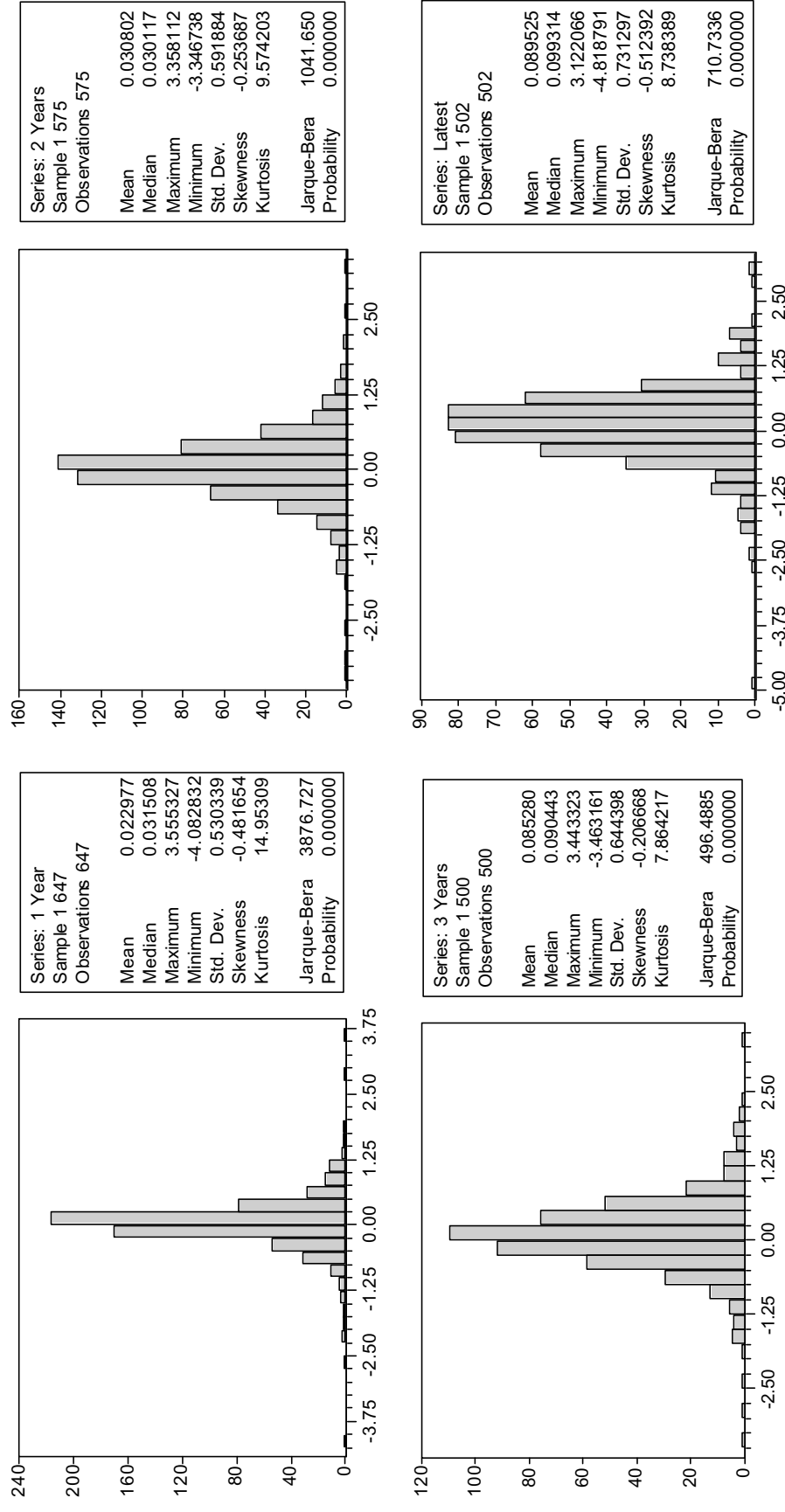
The shape of the revisions to the first published estimates of GDP for all countries is shown in figure 4. The revisions are strongly concentrated around zero, in particular for the  $Y1$  revisions, and as time goes by the distributions become flatter. A few extreme values are encountered for Korea, whose 99q1 first estimate has been corrected downward by about 5 percentage points by the latest estimate, as a consequence of the retrospective revisions published on MEI of March-2000 and successive editions. Other outliers come from Japan (-2.93 percentage points for the revisions of  $Y3$  to  $P$  in 99q1, and -2.62 percentage points for the revision of  $L$  to  $P$  in the same quarter) and Norway (the revision of  $L$  to  $P$  for 97q1 is 2.85 percentage points).

Summary indices of the revisions to the first published estimates for the longest common period under analysis, are presented in table 8. The comparison across countries can be made through the figures 5-10, where the main indices are presented in graphs for both the whole common sample and the last 20 common observations.

From this information some first brief messages can be extracted.

1. The revisions to the first published estimates for the considered data period have been of similar magnitude for most countries, with some exceptions, like Japan, Korea and Portugal, where they have tended to be larger, and, to a minor extent, Belgium, Denmark, Finland, New Zealand and Norway.
2. In the three years covered by successive ( $P$ ,  $Y1$ ,  $Y2$  and  $Y3$ ) GDP estimates, the size of the revisions over the period 1997.2 to 2002.1 becomes smaller (on average,  $|Y1-P| > |Y2-Y1| > |Y3-Y2|$ , see figure 3) for 10 countries over 18, and precisely: Australia, Belgium, Canada, Denmark, Finland, Italy, Korea, Netherlands, Switzerland and USA. An opposite situation is registered for Spain and, less markedly, for France.
3. The test conducted to check whether mean revisions are statistically different from zero (tables 9 and 10) gives the following results:
  - As regards the revisions to the first published estimates of GDP on MEI (table 9), evidences confirming this fact emerge for Canada, Denmark, France, Italy, Norway and United Kingdom.
  - Looking at the process of revision (table 10) we find a significant mean revision of  $Y2$  vs.  $Y1$  only for Canada (last common 20 quarters), while the mean revision of  $Y3$  to  $Y2$  resulted significant for Canada, Japan, New Zealand (last 20 quarters), Switzerland and United Kingdom (whole sample). Finally, Germany is the only country showing significant mean revision in the Latest vs.  $Y3$  comparison.

**Figure 4: Distribution of revisions to the first published estimates - All countries**



**Table 8: Summary indices of revisions to the first published estimates**

First published estimates v.s. estimates 1 year later		Summary statistics													
	AUS	BEL	CAN	CHE	DEU	DNK	ESP	FIN	FRA	GBR	ITA	JPN	KOR	NLD	NOR
sample	95:1-04.1	96:4-04.2	95:1-04.1	95:1-04.1	95:2-04.1	95:1-04.1	95:1-04.1	95:1-04.1	95:1-04.1	95:1-04.1	95:1-04.1	95:1-03.1	97:1-04.1	95:1-04.1	95:1-04.1
n	37	31	37	37	36	33	37	37	37	37	37	33	29	37	37
mean absolute revision	0.3003	0.3452	0.1354	0.2432	0.1418	0.3997	0.1233	0.3675	0.1457	0.1640	0.2148	0.4726	0.8508	0.3052	0.7009
mean revision (Rbar)	-0.0444	0.0373	-0.0070	-0.0264	-0.0079	0.1690	0.0092	0.1247	0.0196	0.0639	0.0057	-0.0770	0.0598	0.0282	0.0247
st. dev.(Rbar) - HAC formula	0.0511	0.0656	0.0311	0.0626	0.0282	0.0711	0.0249	0.0609	0.0342	0.0340	0.0340	0.0700	0.1410	0.0697	0.1209
mean squared revision	0.1608	0.2951	0.0393	0.0988	0.0378	0.3025	0.0340	0.2162	0.0394	0.0436	0.1270	0.3649	1.7740	0.2170	0.7810
relative mean absolute revision	0.3451	0.5301	0.1978	0.5500	0.3297	0.5464	0.1660	0.3416	0.2437	0.2712	0.4612	0.4957	0.4955	0.4662	0.7099
t-stat	-0.8687	0.5678	-0.2259	-0.4222	-0.3020	2.3767	0.3704	2.0482	0.5734	2.2476	0.1877	-1.0992	0.4240	0.4044	0.2045
Is mean revision significant?	NO	NO	NO	NO	NO	YES	NO	YES	NO	YES	NO	NO	NO	NO	NO
Correlation	0.7161	0.5935	0.8978	0.7609	0.9130	0.7118	0.7606	0.9163	0.9024	0.7166	0.7784	0.8712	0.7638	0.6634	0.6799
Min Revision	-1.2	-2.1	-0.7	-1.0	-0.6	-1.1	-0.3	-1.0	-0.5	-0.5	-1.3	-1.4	-4.1	-1.3	-2.1
Max Revision	1.0	0.9	0.4	0.5	0.4	1.5	0.8	1.2	0.6	0.5	1.2	1.2	3.6	1.6	1.8
Range	2.2	3.1	1.1	1.5	0.9	2.6	1.1	2.1	1.2	1.1	2.6	2.6	7.6	2.9	3.9
% Later > Earlier	54.1	51.6	59.5	45.9	50.0	62.2	48.6	56.8	54.1	67.6	51.4	56.8	44.8	59.5	59.5
% Sign(Later) = Sign(Earlier)	93.5	97.3	81.1	94.0	73.0	78.4	100.0	78.4	94.6	97.3	83.8	91.9	93.1	86.5	78.4
Variance of Later estimate	0.3162	0.3568	0.1966	0.2526	0.2203	0.5196	0.0752	0.1092	0.2048	0.0633	0.2384	1.2905	2.5790	0.2210	1.4162
Variance of Earlier estimate	0.2222	0.3637	0.1858	0.0846	0.2133	0.4173	0.0652	0.1250	0.1420	0.0748	0.3156	1.4605	4.2468	0.3795	0.8962
UM %	1.23	0.47	0.13	0.71	0.17	9.44	0.25	7.19	0.98	9.36	0.03	1.62	0.20	0.37	0.08
UR %	2.94	20.76	2.77	7.44	2.95	5.84	6.43	15.89	2.54	19.92	26.01	13.12	39.23	42.62	2.42
UD %	95.84	78.77	97.10	91.86	96.89	84.73	93.32	76.92	96.48	70.72	73.97	85.25	60.57	57.02	97.50

First published estimates v.s. estimates 2 years later		Summary statistics													
	AUS	BEL	CAN	CHE	DEU	DNK	ESP	FIN	FRA	GBR	ITA	JPN	KOR	NLD	NOR
sample	95:1-03.1	96:4-03.1	95:1-03.1	95:1-03.1	95:2-03.1	95:1-03.1	95:1-03.1	95:1-03.1	95:1-03.1	95:1-03.1	95:1-03.1	95:1-03.1	97:1-03.1	95:1-03.1	95:1-03.1
n	33	26	33	33	32	33	33	33	33	33	33	33	25	33	33
mean absolute revision	0.2976	0.4893	0.2114	0.2356	0.2636	0.5449	0.2040	0.5292	0.1957	0.1828	0.2762	0.5302	0.8515	0.3678	0.5466
mean revision (Rbar)	-0.0200	0.0190	0.0541	-0.0198	-0.0252	0.2130	0.0429	0.1503	0.0237	0.0387	0.0322	-0.0250	-0.0058	-0.0150	0.0327
st. dev.(Rbar) - HAC formula	0.0595	0.0944	0.0404	0.0678	0.0480	0.0908	0.0471	0.0829	0.0425	0.0342	0.0479	0.0870	0.1479	0.0722	0.1077
mean squared revision	0.1413	0.3962	0.0623	0.0910	0.1029	0.5311	0.0671	0.4630	0.0553	0.0526	0.1874	0.4400	1.4276	0.2763	0.4528
relative mean absolute revision	0.3280	0.6987	0.2748	0.5818	0.3817	0.7083	0.2613	0.4475	0.3310	0.3245	0.5108	0.5700	0.4316	0.5693	0.5338
t-stat	-0.3357	0.2014	-1.3371	-0.2914	-0.5244	2.3460	0.9110	1.8130	0.5564	1.1319	0.6727	-0.2875	-0.0392	-0.2085	0.3034
Is mean revision significant?	NO	NO	NO	NO	NO	YES	NO	NO	NO	NO	NO	NO	NO	NO	NO
Correlation	0.7133	0.5655	0.8608	0.7515	0.7909	0.5282	0.6673	0.8258	0.8480	0.6547	0.7139	0.8457	0.8474	0.5531	0.8263
Min Revision	-0.7	-1.6	-0.5	-0.8	-0.6	-1.5	-0.4	-1.1	-0.5	-0.6	-1.5	-2.0	-3.1	-1.2	-1.4
Max Revision	0.9	1.4	0.5	0.6	0.5	2.2	0.7	1.5	0.4	0.4	1.3	0.9	3.4	1.7	1.0
Range	1.6	3.0	1.0	1.3	1.1	3.7	1.0	2.6	0.9	1.0	2.8	2.9	6.5	2.8	2.4
% Later > Earlier	42.4	53.8	57.6	45.5	53.1	60.6	51.5	57.6	57.6	60.6	57.6	54.5	60.0	45.5	54.5
% Sign(Later) = Sign(Earlier)	100.0	76.9	97.0	78.8	81.3	72.7	100.0	75.8	93.9	97.0	93.9	78.8	92.0	81.8	78.8
Variance of Later estimate	0.2721	0.4875	0.2281	0.2026	0.2547	0.5802	0.1141	0.1024	0.1948	0.0718	0.3064	1.2412	4.6716	0.2067	1.4239
Variance of Earlier estimate	0.2090	0.4202	0.1841	0.0634	0.2327	0.4382	0.0727	1.3787	0.1353	0.0761	0.3425	1.5254	4.6823	0.3790	0.9818
UM %	0.28	0.09	4.69	0.43	0.62	8.54	2.74	4.88	1.01	2.84	0.55	0.14	0.00	0.08	0.24
UR %	5.13	16.21	0.51	2.69	6.74	12.69	2.90	24.87	0.07	19.13	19.28	19.50	7.74	47.98	0.01
UD %	94.59	83.70	94.80	96.58	92.65	78.77	94.36	70.45	98.91	78.03	80.16	80.35	92.26	51.93	99.26

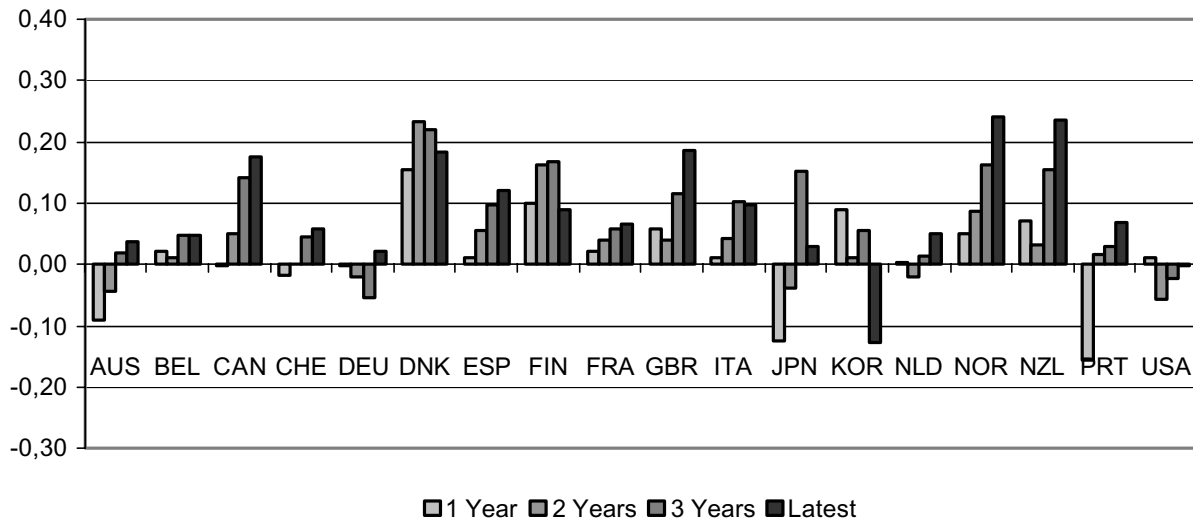
**Table 8 (continued): Summary indices of revisions to the first published estimates**

First published estimates v.s. estimates 3 years later		AUS	BEL	CAN	CHE	DEU	DNK	ESP	FIN	FRA	GBR	ITA	JPN	KOR	NLD	NOR
Summary statistics		95:1-02.1	96:4-02.1	95:1-02.1	95:1-02.1	95:2-02.1	95:1-02.1	95:1-02.1	95:1-02.1	95:1-02.1	95:1-02.1	95:1-02.1	95:1-02.1	97:1-02.1	95:1-02.1	95:1-01.4
sample	n	29	22	29	29	28	29	29	29	29	29	29	29	21	29	28
mean absolute revision		0.3678	0.5521	0.2357	0.2126	0.3617	0.5695	0.2957	0.4460	0.2889	0.1769	0.2626	0.6865	0.9794	0.4248	0.8259
mean revision (Rbar)		0.0185	0.0485	0.1413	-0.0551	-0.0551	0.2203	0.0974	0.1668	0.0573	0.1164	0.1038	0.1530	0.0555	0.0140	0.1618
st. dev.(Rbar) - HAC formula		0.0671	0.1158	0.0499	0.0657	0.0692	0.0996	0.0772	0.0894	0.0552	0.0334	0.0503	0.1401	0.1698	0.1006	0.1289
mean squared revision		0.2006	0.4693	0.0837	0.0723	0.1753	0.5609	0.1461	0.3501	0.1151	0.0509	0.1788	0.8428	1.7867	0.3814	0.9924
relative mean absolute revision		0.3738	0.6724	0.2766	0.6066	0.6602	0.7122	0.3411	0.3782	0.4266	0.2733	0.4615	0.7060	0.4588	0.5704	0.9332
t-stat		0.2764	0.4185	2.6321	0.6849	-0.7964	2.2116	1.2617	1.8666	1.0372	3.4811	2.0643	1.0923	0.3267	0.1391	1.2550
Is mean revision significant?		NO	NO	YES	NO	NO	YES	NO	NO	NO	YES	YES	NO	NO	NO	NO
Correlation		0.7011	0.5655	0.8748	0.7747	0.7317	0.5007	0.5424	0.8756	0.7532	0.7541	0.7618	0.7331	0.8305	0.3540	0.5062
Min Revision		-0.9	-1.5	-0.4	-0.6	-0.7	-1.7	-0.5	-0.9	-0.6	-0.3	-1.4	-2.9	-3.5	-1.7	-1.7
Max Revision		0.9	1.1	0.7	0.5	0.7	2.2	1.1	2.3	0.7	0.6	1.4	1.8	3.4	1.8	2.1
Range		1.7	2.6	1.1	1.1	1.4	3.9	1.5	2.3	1.2	0.9	2.7	4.7	6.9	3.4	3.8
% Later > Earlier		48.3	54.5	75.9	62.1	39.3	58.6	44.8	55.2	40.0	72.4	65.5	55.2	57.1	58.6	64.3
% Sign(Later) = Sign(Earlier)		93.1	81.8	96.6	79.3	78.6	69.0	40.0	75.9	93.1	96.6	86.2	69.0	95.2	79.3	67.9
Variance of Later estimate		0.3916	0.5855	0.2715	0.1729	0.3644	0.9598	0.1926	1.0410	0.2583	0.0748	0.3103	1.2447	5.0655	0.2140	0.8344
Variance of Earlier estimate		0.2235	0.4829	0.2010	0.0636	0.2455	0.4168	0.0695	1.3810	0.1452	0.0768	0.3827	1.7200	5.4279	0.3651	1.1029
UM %		0.17	0.50	23.85	2.80	1.73	8.65	6.50	7.95	2.85	26.65	6.03	2.78	0.17	0.05	2.64
UR %		0.58	14.65	0.07	1.51	1.65	12.03	0.45	22.68	0.00	9.89	21.11	28.91	11.87	50.87	34.82
UD %		99.25	84.85	76.09	95.69	96.62	79.32	93.05	69.37	97.15	63.47	72.86	68.32	87.96	49.08	62.54

First published estimates v.s. latest estimates		AUS	BEL	CAN	CHE	DEU	DNK	ESP	FIN	FRA	GBR	ITA	JPN	KOR	NLD	NOR
Summary statistics		95:1-02.1	96:4-02.1	95:1-02.1	95:1-02.1	95:2-02.1	95:1-02.1	95:1-02.1	95:1-02.1	95:1-02.1	95:1-02.1	95:1-02.1	95:1-02.1	97:1-02.1	95:1-02.1	95:1-01.4
sample	n	29	22	29	29	28	29	29	29	29	29	29	29	21	29	28
mean absolute revision		0.3678	0.5521	0.2357	0.2126	0.3617	0.5695	0.2957	0.4460	0.2889	0.1769	0.2626	0.6865	0.9794	0.4248	0.8259
mean revision (Rbar)		0.0185	0.0485	0.1413	-0.0551	-0.0551	0.2203	0.0974	0.1668	0.0573	0.1164	0.1038	0.1530	0.0555	0.0140	0.1618
st. dev.(Rbar) - HAC formula		0.0671	0.1158	0.0499	0.0657	0.0692	0.0996	0.0772	0.0894	0.0552	0.0334	0.0503	0.1401	0.1698	0.1006	0.1289
mean squared revision		0.2006	0.4693	0.0837	0.0723	0.1753	0.5609	0.1461	0.3501	0.1151	0.0509	0.1788	0.8428	1.7867	0.3814	0.9924
relative mean absolute revision		0.3738	0.6724	0.2766	0.6066	0.6602	0.7122	0.3411	0.3782	0.4266	0.2733	0.4615	0.7060	0.4588	0.5704	0.9332
t-stat		0.2764	0.4185	2.6321	0.6849	-0.7964	2.2116	1.2617	1.8666	1.0372	3.4811	2.0643	1.0923	0.3267	0.1391	1.2550
Is mean revision significant?		NO	NO	YES	NO	NO	YES	NO	NO	NO	YES	YES	NO	NO	NO	NO
Correlation		0.7011	0.5655	0.8748	0.7747	0.7317	0.5007	0.5424	0.8756	0.7532	0.7541	0.7618	0.7331	0.8305	0.3540	0.5062
Min Revision		-0.9	-1.5	-0.4	-0.6	-0.7	-1.7	-0.5	-0.9	-0.6	-0.3	-1.4	-2.9	-3.5	-1.7	-1.7
Max Revision		0.9	1.1	0.7	0.5	0.7	2.2	1.1	2.3	0.7	0.6	1.4	1.8	3.4	1.8	2.1
Range		1.7	2.6	1.1	1.1	1.4	3.9	1.5	2.3	1.2	0.9	2.7	4.7	6.9	3.4	3.8
% Later > Earlier		48.3	54.5	75.9	62.1	39.3	58.6	44.8	55.2	40.0	72.4	65.5	55.2	57.1	58.6	64.3
% Sign(Later) = Sign(Earlier)		93.1	81.8	96.6	79.3	78.6	69.0	40.0	75.9	93.1	96.6	86.2	69.0	95.2	79.3	67.9
Variance of Later estimate		0.3916	0.5855	0.2715	0.1729	0.3644	0.9598	0.1926	1.0410	0.2583	0.0748	0.3103	1.2447	5.0655	0.2140	0.8344
Variance of Earlier estimate		0.2235	0.4829	0.2010	0.0636	0.2455	0.4168	0.0695	1.3810	0.1452	0.0768	0.3827	1.7200	5.4279	0.3651	1.1029
UM %		0.17	0.50	23.85	2.80	1.73	8.65	6.50	7.95	2.85	26.65	6.03	2.78	0.17	0.05	2.64
UR %		0.58	14.65	0.07	1.51	1.65	12.03	0.45	22.68	0.00	9.89	21.11	28.91	11.87	50.87	34.82
UD %		99.25	84.85	76.09	95.69	96.62	79.32	93.05	69.37	97.15	63.47	72.86	68.32	87.96	49.08	62.54

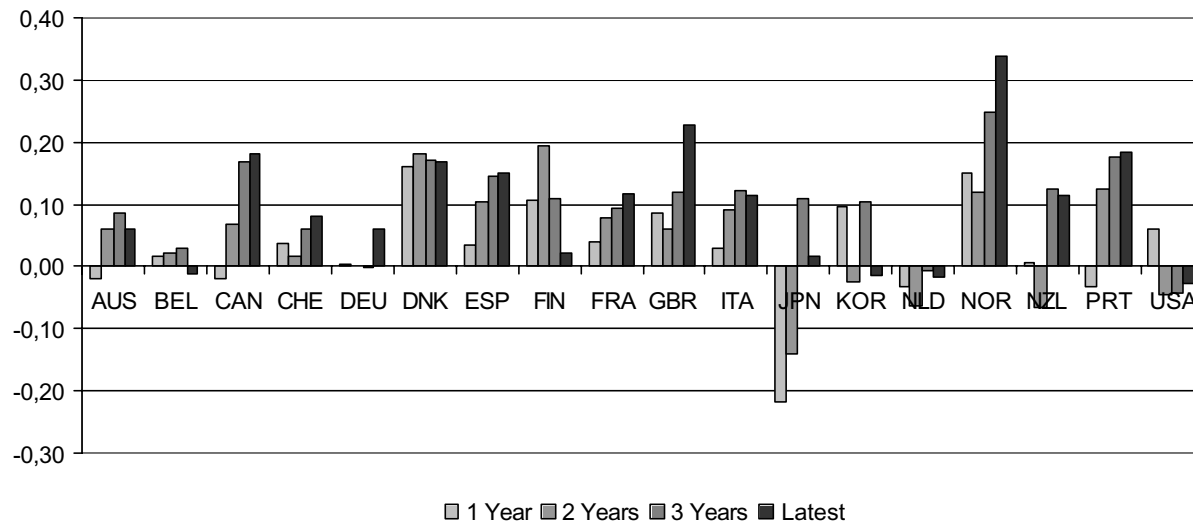
**Figure 5: Summary indices of revisions to the first published estimates. Mean revision**

**1995.1-2002.1\***



\* DEU: 1995.2-2002.1; BEL: 1996.4-2002.1; KOR: 1997.1-2002.1; NOR: 1995.1-2001.4; PRT: 1996.1-2001.4.

**1997.2-2002.1\***



\* NOR and PRT: 1997.1-2001.4.

**Table 9: Significance of the mean revision to the first published estimates\***

	<b>(1995.1-2002.1)**</b>				<b>(1997.2-2002.1)***</b>				
	<b>1 Year</b>	<b>2 Years</b>	<b>3 Years</b>	<b>Latest</b>	<b>1 Year</b>	<b>2 Years</b>	<b>3 Years</b>	<b>Latest</b>	
<b>AUS</b>	NO	NO	NO	NO	<b>AUS</b>	NO	NO	NO	NO
<b>BEL</b>	NO	NO	NO	NO	<b>BEL</b>	NO	NO	NO	NO
<b>CAN</b>	NO	NO	<b>YES</b>	<b>YES</b>	<b>CAN</b>	NO	NO	<b>YES</b>	<b>YES</b>
<b>CHE</b>	NO	NO	NO	NO	<b>CHE</b>	NO	NO	NO	NO
<b>DEU</b>	NO	NO	NO	NO	<b>DEU</b>	NO	NO	NO	NO
<b>DNK</b>	NO	<b>YES</b>	<b>YES</b>	NO	<b>DNK</b>	NO	NO	NO	NO
<b>ESP</b>	NO	NO	NO	NO	<b>ESP</b>	NO	NO	NO	NO
<b>FIN</b>	NO	NO	NO	NO	<b>FIN</b>	NO	NO	NO	NO
<b>FRA</b>	NO	NO	NO	NO	<b>FRA</b>	NO	NO	NO	<b>YES</b>
<b>GBR</b>	NO	NO	<b>YES</b>	<b>YES</b>	<b>GBR</b>	<b>YES</b>	NO	<b>YES</b>	<b>YES</b>
<b>ITA</b>	NO	NO	<b>YES</b>	NO	<b>ITA</b>	NO	<b>YES</b>	<b>YES</b>	NO
<b>JPN</b>	NO	NO	NO	NO	<b>JPN</b>	NO	NO	NO	NO
<b>KOR</b>	NO	NO	NO	NO	<b>KOR</b>	NO	NO	NO	NO
<b>NLD</b>	NO	NO	NO	NO	<b>NLD</b>	NO	NO	NO	NO
<b>NOR</b>	NO	NO	NO	NO	<b>NOR</b>	NO	NO	NO	<b>YES</b>
<b>NZL</b>	NO	NO	NO	NO	<b>NZL</b>	NO	NO	NO	NO
<b>PRT</b>	NO	NO	NO	NO	<b>PRT</b>	NO	NO	NO	NO
<b>USA</b>	NO	NO	NO	NO	<b>USA</b>	NO	NO	NO	NO

\* *t*-test, HAC estimated variance, 5% significance.

\*\* DEU: 1995.2-2002.1; BEL: 1996.4-2002.1; KOR: 1997.1-2002.1; NOR: 1995.1-2001.4; PRT: 1996.1-2001.4.

\*\*\* NOR and PRT: 1997.1-2001.4.

**Table 10: Comparison of successive revisions. Significance of the mean revision\***

	<b>(1995.1-2002.1)**</b>				<b>(1997.2-2002.1)***</b>				
	<b>Y1_P</b>	<b>Y2_Y1</b>	<b>Y3_Y2</b>	<b>L_Y3</b>	<b>Y1_P</b>	<b>Y2_Y1</b>	<b>Y3_Y2</b>	<b>L_Y3</b>	
<b>AUS</b>	NO	NO	NO	NO	<b>AUS</b>	NO	NO	NO	NO
<b>BEL</b>	NO	NO	NO	NO	<b>BEL</b>	NO	NO	NO	NO
<b>CAN</b>	NO	NO	<b>YES</b>	NO	<b>CAN</b>	NO	<b>YES</b>	<b>YES</b>	NO
<b>CHE</b>	NO	NO	<b>YES</b>	NO	<b>CHE</b>	NO	NO	<b>YES</b>	NO
<b>DEU</b>	NO	NO	NO	<b>YES</b>	<b>DEU</b>	NO	NO	NO	<b>YES</b>
<b>DNK</b>	NO	NO	NO	NO	<b>DNK</b>	NO	NO	NO	NO
<b>ESP</b>	NO	NO	NO	NO	<b>ESP</b>	NO	NO	NO	NO
<b>FIN</b>	NO	NO	NO	NO	<b>FIN</b>	NO	NO	NO	NO
<b>FRA</b>	NO	NO	NO	NO	<b>FRA</b>	NO	NO	NO	NO
<b>GBR</b>	NO	NO	<b>YES</b>	NO	<b>GBR</b>	<b>YES</b>	NO	NO	NO
<b>ITA</b>	NO	NO	NO	NO	<b>ITA</b>	NO	NO	NO	NO
<b>JPN</b>	NO	NO	<b>YES</b>	NO	<b>JPN</b>	NO	NO	<b>YES</b>	NO
<b>KOR</b>	NO	NO	NO	NO	<b>KOR</b>	NO	NO	NO	NO
<b>NLD</b>	NO	NO	NO	NO	<b>NLD</b>	NO	NO	NO	NO
<b>NOR</b>	NO	NO	NO	NO	<b>NOR</b>	NO	NO	NO	NO
<b>NZL</b>	NO	NO	NO	NO	<b>NZL</b>	NO	NO	<b>YES</b>	NO
<b>PRT</b>	NO	NO	NO	NO	<b>PRT</b>	NO	NO	NO	NO
<b>USA</b>	NO	NO	NO	NO	<b>USA</b>	NO	NO	NO	NO

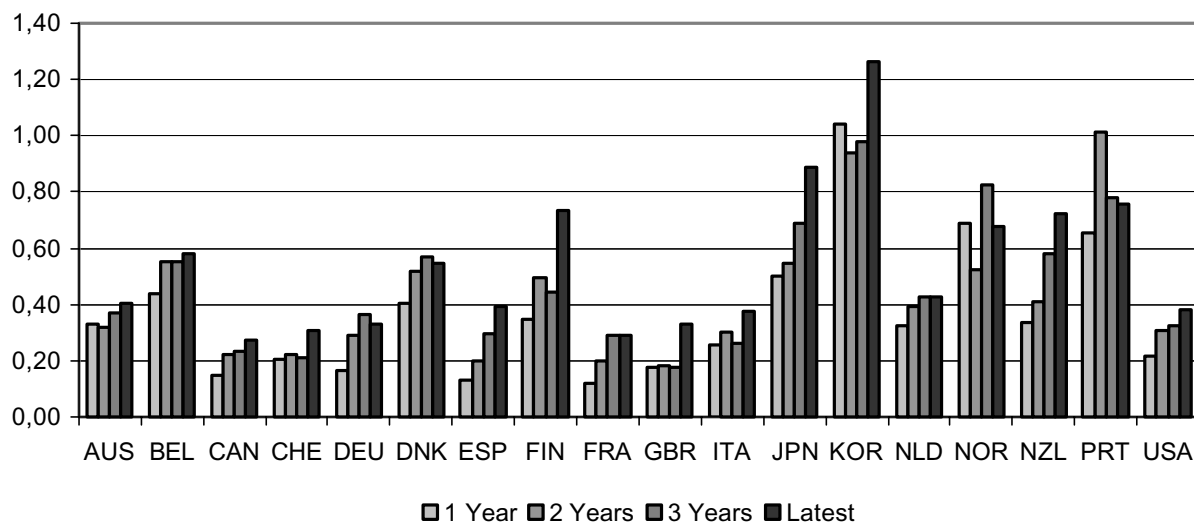
\* *t*-test, HAC estimated variance, 5% significance.

\*\* DEU: 1995.2-2002.1; BEL: 1996.4-2002.1; KOR: 1997.1-2002.1; NOR: 1995.1-2001.4; PRT: 1996.1-2001.4.

\*\*\* NOR and PRT: 1997.1-2001.4.

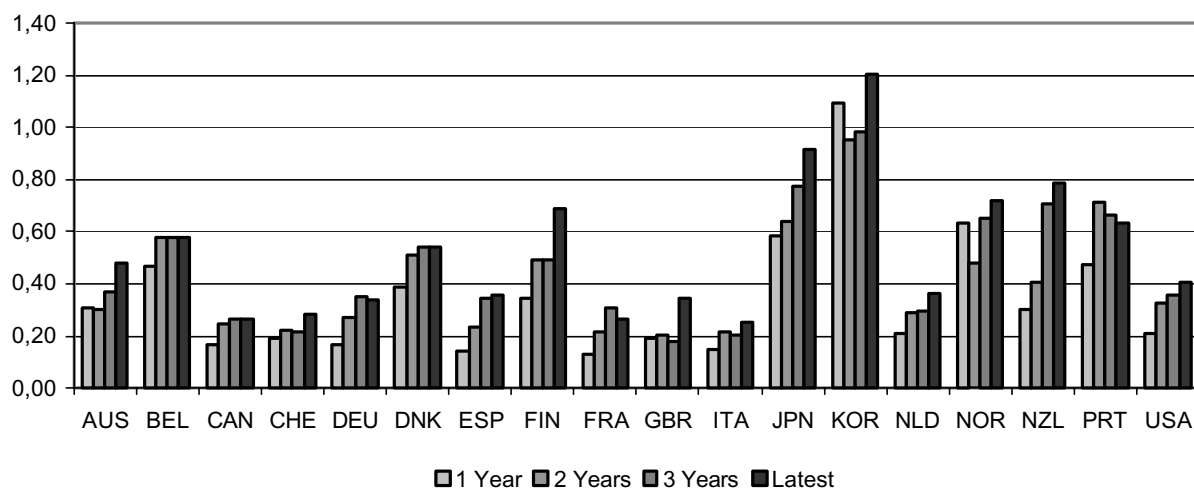
**Figure 6: Summary indices of revisions to the first published estimates. Mean absolute revision**

**1995.1-2002.1\***



\* DEU: 1995.2-2002.1; BEL: 1996.4-2002.1; KOR: 1997.1-2002.1; NOR: 1995.1-2001.4; PRT: 1996.1-2001.4.

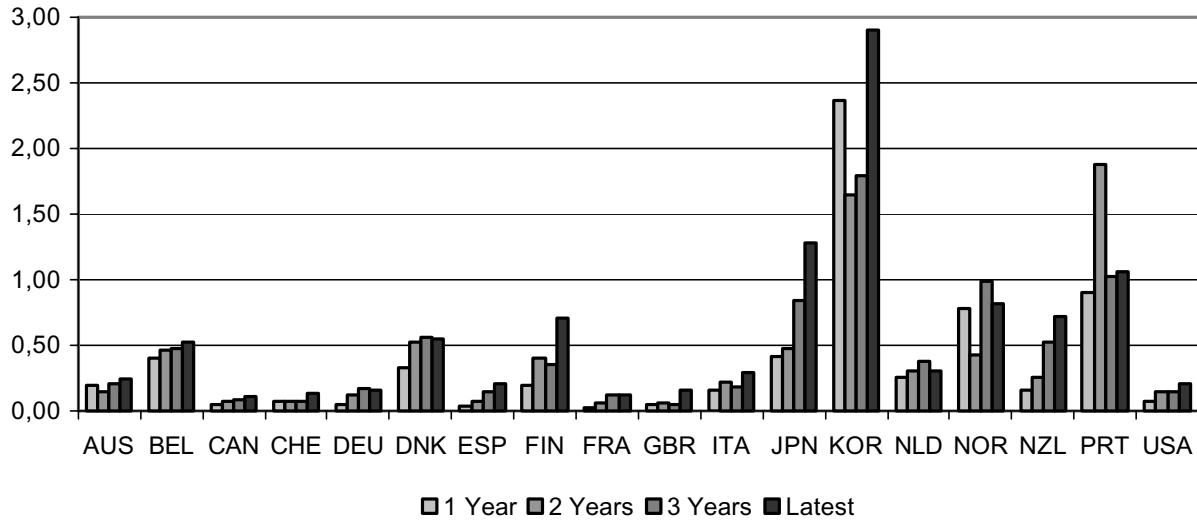
**1997.2-2002.1\***



\* NOR and PRT: 1997.1-2001.4.

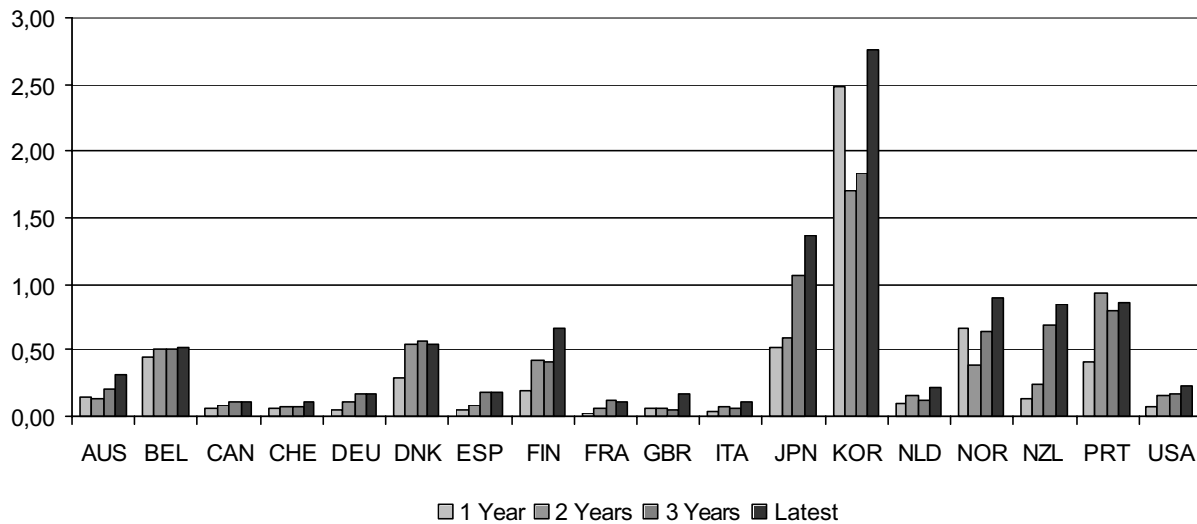
**Figure 7: Summary indices of revisions to the first published estimates. Mean squared revision**

**1995.1-2002.1\***



\* DEU: 1995.2-2002.1; BEL: 1996.4-2002.1; KOR: 1997.1-2002.1; NOR: 1995.1-2001.4; PRT: 1996.1-2001.4.

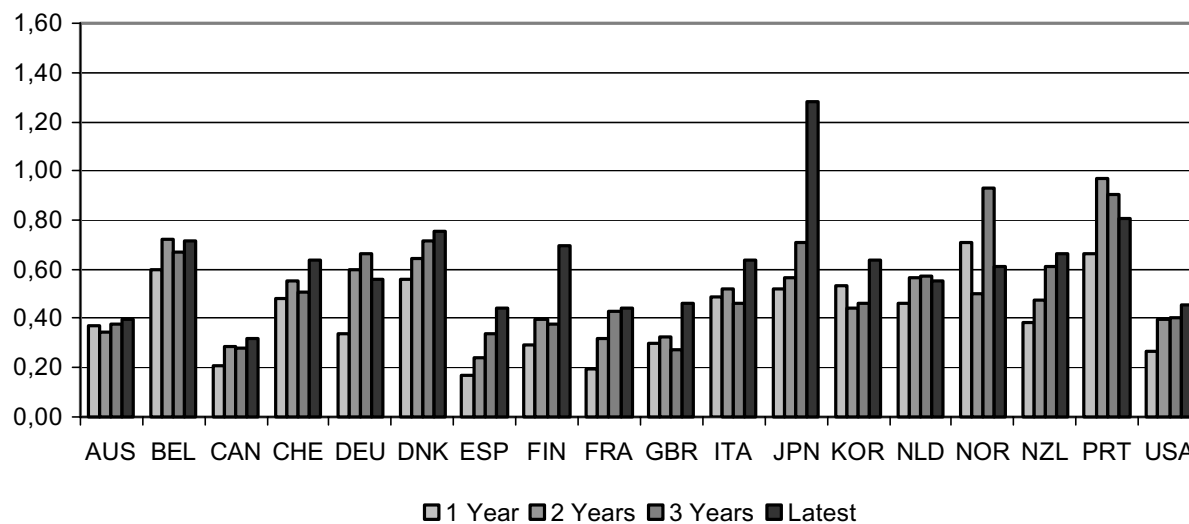
**1997.2-2002.1\***



\* NOR and PRT: 1997.1-2001.4.

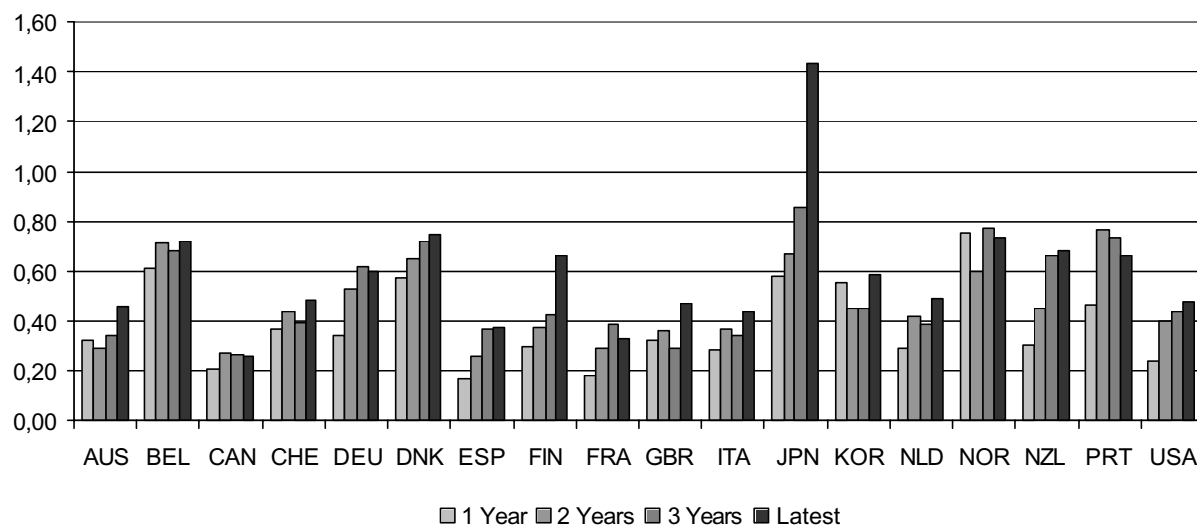
**Figure 8: Summary indices of revisions to the First published estimates**

**1995.1-2002.1\***



\* DEU: 1995.2-2002.1; BEL: 1996.4-2002.1; KOR: 1997.1-2002.1; NOR: 1995.1-2001.4; PRT: 1996.1-2001.4.

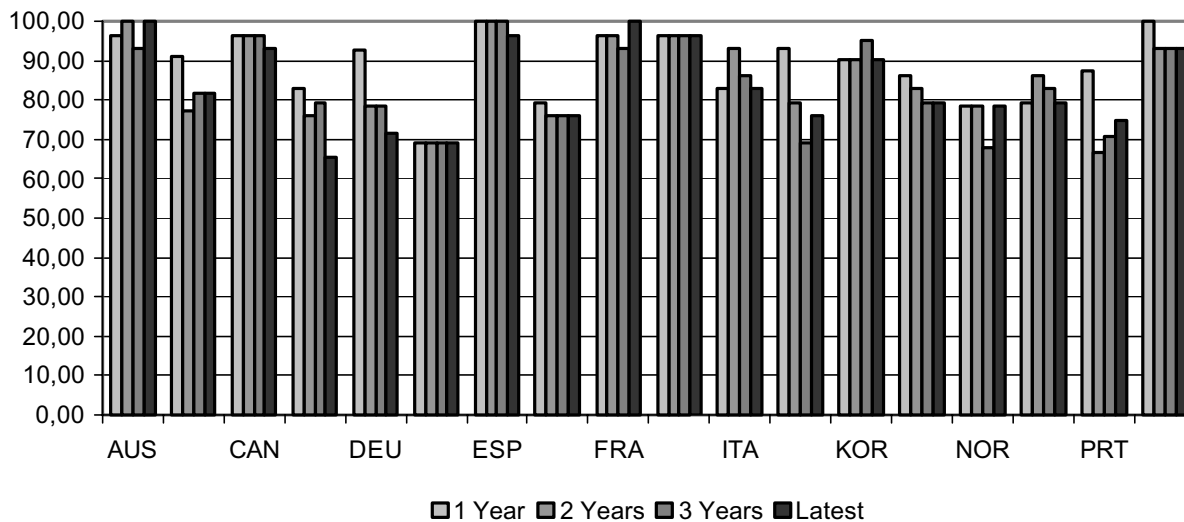
**1997.2-2002.1\***



\* NOR and PRT: 1997.1-2001.4.

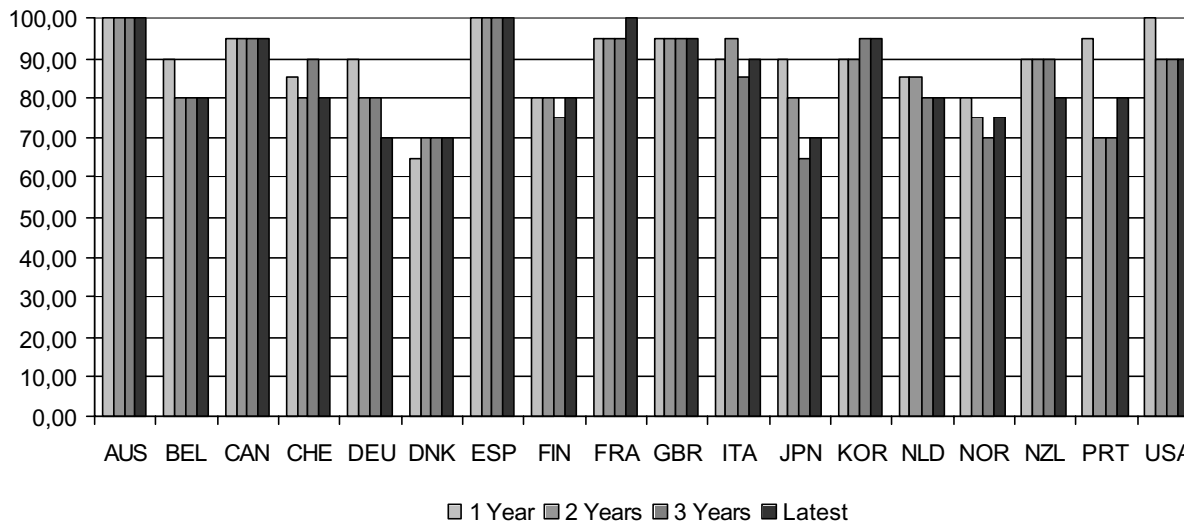
**Figure 9: Summary indices of revisions to the first published estimates. % of sign(E) = sign(L)**

**1995.1-2002.1\***



\* DEU: 1995.2-2002.1; BEL: 1996.4-2002.1; KOR: 1997.1-2002.1; NOR: 1995.1-2001.4; PRT: 1996.1-2001.4.

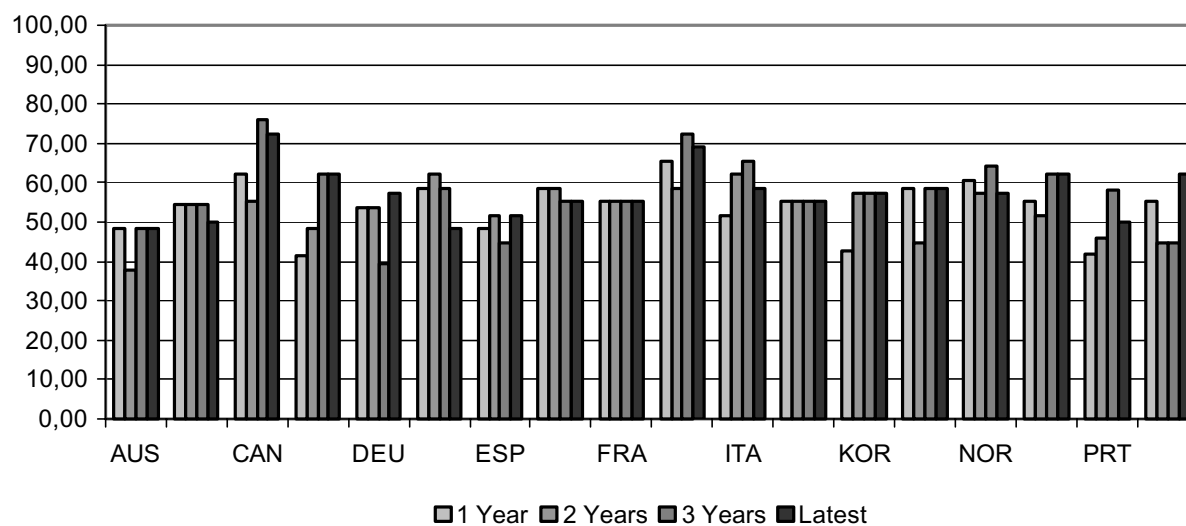
**1997.2-2002.1\***



\* NOR and PRT: 1997.1-2001.4.

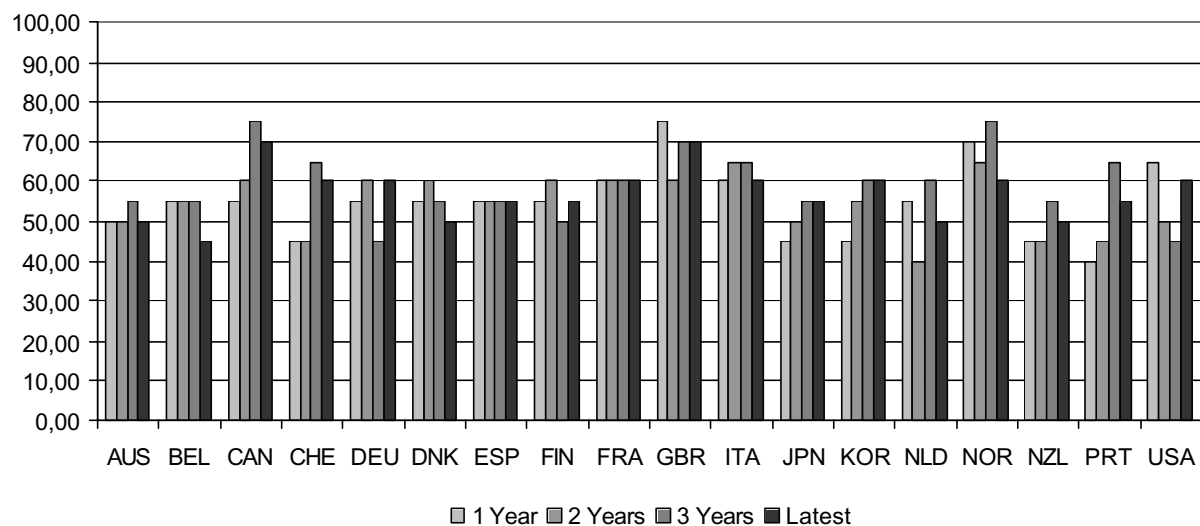
**Figure 10: Summary indices of revisions to the First published estimates. % of L > E.**

**1995.1-2002.1\***



\* DEU: 1995.2-2002.1; BEL: 1996.4-2002.1; KOR: 1997.1-2002.1; NOR: 1995.1-2001.4; PRT: 1996.1-2001.4.

**1997.2-2002.1\***



\* NOR and PRT: 1997.1-2001.4.

## **APPENDICES**

**A1: Data availability for GDP in the QNA-MEI revisions database. Period under review: MEI published in May 1995 – August 2005.**

Country	CONSTANT PRICES				CURRENT PRICES			
	Seasonally adjusted		Raw data		Seasonally adjusted		Raw data	
	MEI edition	Vintage	MEI edition	Vintage	MEI edition	Vintage	MEI edition	Vintage
1 AUS	First	may-95 94q4	-	-	may-95 94q4	-	-	
	Last	aug-05 05q1	-	-	aug-05 05q1	-	-	
2 AUT	First	may-95 94q4	may-95 94q4	may-95 94q4	may-95 94q4	may-95 94q4		
	Last	sep-00 00q1	feb-00 99q3	sep-00 00q1	feb-00 99q3	sep-00 00q1		
	First	nov-03 03q2	oct-00 00q2	nov-03 03q2	oct-00 00q2	nov-03 03q2		
	Last	aug-05 05q1	oct-03 03q2	aug-05 05q1	oct-03 03q2	aug-05 05q1		
3 BEL	First	mar-97 96q3	-	-	nov-99 99q2	-	-	
	Last	aug-05 05q2	-	-	aug-05 05q2	-	-	
4 CAN	First	may-95 94q4	-	-	may-95 94q4	-	-	
	Last	aug-05 05q1	-	-	aug-05 05q1	-	-	
5 CHE	First	may-95 94q4	-	-	may-95 94q4	-	-	
	Last	aug-05 05q1	-	-	aug-05 05q1	-	-	
6 CZE	First	jul-97 99q1	feb-96 95q3	jul-97 99q1	feb-96 95q3	feb-96 95q3		
	Last	sep-00 00q1	jun-99 98q4	sep-00 00q1	jun-99 98q4	jun-99 98q4		
	First	oct-03 03q2	oct-00 00q2	oct-03 03q2	oct-00 00q2	oct-00 00q2		
	Last	aug-05 05q1	set-03 03q1	aug-05 05q1	sep-03 03q1	aug-05 05q1		
7 DEU	First	nov-95 95q2	may-95 94q4	nov-95 95q2	may-95 94q4	may-95 94q4		
	Last	aug-05 05q1	oct-95 95q2	aug-05 05q1	oct-95 95q2	oct-95 95q2		
8 DNK	First	may-95 94q4	-	-	may-95 94q4	-	-	
	Last	aug-05 05q1	-	-	aug-05 05q1	-	-	
9 ESP	First	may-95 94q4	-	-	may-95 94q4	-	-	
	Last	aug-05 05q1	-	-	aug-05 05q1	-	-	
10 FIN	First	may-95 94q4	may-95 94q4	may-95 94q4	may-95 94q4	may-95 94q4		
	Last	aug-05 05q1	apr-99 98q3	aug-05 05q1	apr-99 98q3	apr-99 98q3		
11 FRA	First	may-95 94q4	-	-	may-95 94q4	-	-	
	Last	aug-05 05q1	-	-	aug-05 05q1	-	-	
12 GBR	First	may-95 94q4	-	-	may-95 94q4	-	-	
	Last	aug-05 05q1	-	-	aug-05 05q1	-	-	
13 GRC	First	apr-04 03q4	-	-	apr-04 03q4	-	-	
	Last	aug-05 05q1	-	-	aug-05 05q1	-	-	
14 HUN	First	jul-05 05q1	apr-03 02q3	aug-05 05q1	apr-03 02q3	apr-03 02q3		
	Last	aug-05 05q1	jun-05 04q4	aug-05 05q1	jun-05 04q4	jun-05 04q4		
15 IRL	First	nov-04 04q2	jan-03 02q2	nov-04 04q2	jan-03 02q2	jan-03 02q2		
	Last	aug-05 04q4	oct-04 04q2	aug-05 04q4	oct-04 04q2	oct-04 04q2		
16 ISL	First	-	apr-03 02q4	-	apr-03 02q4	apr-03 02q4		
	Last	-	aug-05 05q1	-	aug-05 05q1	aug-05 05q1		
17 ITA	First	may-95 94q4	-	-	may-95 94q4	-	-	
	Last	aug-05 05q1	-	-	aug-05 05q1	-	-	
18 JPN	First	may-95 94q4	-	-	may-95 94q4	-	-	
	Last	aug-05 05q1	-	-	aug-05 05q1	-	-	
19 KOR	First	may-97 96q4	-	-	may-97 96q4	-	-	
	Last	aug-05 05q2	-	-	aug-05 05q2	-	-	
20 LUX	First	-	aug-05 04q4	-	aug-05 04q4	aug-05 04q4		
	Last	-	aug-05 05q1	-	aug-05 05q1	aug-05 05q1		
21 MEX	First	may-95 94q4	may-95 94q4	may-95 94q4	may-95 94q4	may-95 94q4		
	Last	sep-00 00q1	aug-05 05q1	sep-00 00q1	aug-05 05q1	aug-05 05q1		
22 NLD	First	may-95 94q4	-	-	may-95 94q4	-	-	
	Last	aug-05 05q1	-	-	aug-05 04q4	-	-	
23 NOR	First	may-95 94q4	may-95 94q4	may-95 94q4	may-95 94q4	may-95 94q4		
	Last	aug-05 05q1	sep-00 00q1	aug-05 05q1	sep-00 00q1	sep-00 00q1		
24 NZL	First	may-95 94q4	-	-	may-95 94q4	-	-	
	Last	aug-05 05q1	-	-	aug-05 05q1	-	-	
25 POL	First	-	sep-02 02q1	-	sep-02 02q1	sep-02 02q1		
	Last	-	aug-05 05q1	-	aug-05 05q1	aug-05 05q1		
26 PRT	First	nov-96 95q4	may-95 93q4	nov-96 95q4	may-95 93q4	may-95 93q4		
	Last	aug-05 05q1	oct-96 94q4	aug-05 05q1	oct-96 94q4	oct-96 94q4		
27 SVK	First	-	feb-01 00q3	-	feb-01 00q3	feb-01 00q3		
	Last	-	aug-05 05q1	-	aug-05 05q1	aug-05 05q1		
28 SWE	First	may-95 94q4	may-95 94q4	may-95 94q4	may-95 94q4	may-95 94q4		
	Last	sep-00 00q2	aug-05 05q1	sep-00 00q1	aug-05 05q1	aug-05 05q1		
29 TUR	First	may-95 94q4	may-95 94q4	may-95 94q4	may-95 94q4	may-95 94q4		
	Last	sep-00 00q2	aug-05 05q1	sep-00 00q2	aug-05 05q1	aug-05 05q1		
30 USA	First	may-95 95q1	-	-	may-95 95q1	-	-	
	Last	aug-05 05q2	-	-	aug-05 05q2	-	-	

**A.2: Months of publication on MEI of the first estimates of quarterly GDP (constant prices, seasonally adjusted). Period under review: MEI published in May 1995 – August 2005\*.**

Country (covered period)	Q1	Q2	Q3	Q4
<b>Australia</b> (1995.1-2005.1)	July: 97-00,02 June: 95,96,01,03-05	October: 97,00-03 September: 95,96,98,99,04	January t+1: 96-03 December: 95,04	May t+1: 98,99 April t+1: 95,96,01-03 March t+1: 97,00,04
<b>Belgium</b> (1996.4-2005.2)	December: 98 September: 99,00 August: 97,01,02 June: 03 May: 04-05	December: 97,98 November: 99-02 September: 03 August: 04-05	March t+1: 98,99 February t+1: 97,00-02 December: 03 November: 04	July t+1: 98 May t+1: 96,97,99-01 April t+1: 03 March t+1: 02,04
<b>Canada</b> (1995.1-2005.1)	July: 95,99,01 June: 96-98,00,02-05	September: 95-04	January t+1: 97 December: 95,96,98-04	March t+1: 95-04
<b>Denmark</b> (1995.1-2005.1)	August: 95-97 July: 98-01 June: 02-05	November: 95,98,99 October: 96,97,00,01 September: 02-04	March t+1: 95,97 February t+1: 96 January t+1: 98-01,03 December: 02,04	May t+1: 95,98,99 April t+1: 96,97,00 March t+1: 01-04
<b>Finland</b> (1995.1-2005.1)	July: 95-03,05 June: 04	November: 98,99 October: 95-97,00-04	January t+1: 95-04	May t+1: 98,99 April t+1: 95-97 March t+1: 00-04
<b>France</b> (1995.1-2005.1)	August: 99 July: 95,97 June: 96,98,00-05	October: 95,97,00,01 September: 96,98,99,02-04	January t+1: 97 December: 95,96,98-04	March t+1: 95-04
<b>Germany</b> (1995.2-2005.1)	July: 96,97,99,00 June: 98,01-05	October: 95-99 September: 00-04	March t+1: 95 January t+1: 96,97 December: 98-04	April t+1: 95,96,98 March t+1: 97,99-04
<b>Italy</b> (1995.1-2005.1)	August: 95-97 July: 98-00 June: 01-05	November: 95 October: 96-02 September: 03-04	February t+1: 96,99 January t+1: 95,97,98 December: 00-04	July t+1: 98 May t+1: 95,96 April t+1: 97,99,00 March t+1: 01-04
<b>Japan</b> (1995.1-2005.1)	July: 95-02 June: 03-05	October: 95-01 September: 02-04	January t+1: 95,97,01 December: 96,98-00,02-04	April t+1: 95-01 March t+1: 02-04
<b>Korea</b> (1997.1-2005.2)	October: 97 July: 99 June: 98,00-05	October: 97,02 September: 98-01,03,04 August: 05	January t+1: 97,98 December: 99-04	April t+1: 97-04
<b>Netherlands</b> (1995.1-2005.1)	September: 98,00 August: 95,96 July: 99 June: 97,01-05	December: 96 November: 95 September: 97-04	February t+1: 95,98 January t+1: 99 December: 96,97,00-04	May t+1: 95,97 March t+1: 96,98-04
<b>New Zealand</b> (1995.1-2005.1)	October: 95 August: 96 July: 97-05	November: 98,99 October: 95-97,00-04	July t+1: 00 February t+1: 95,96 January t+1: 97-99,01-04	July t+1: 00 May t+1: 95,98 April t+1: 96,97,99,01-04
<b>Norway</b> (1995.1-2005.1)	December: 95 October: 02 September: 96 July: 97-01,03,05 June: 04	December: 95 October: 96,97,00-04 September: 98,99	February t+1: 95,97 January t+1: 96,99-04 December: 98	May t+1: 95 April t+1: 98,00,02-04 March t+1: 96-99,01
<b>Portugal</b> (1996.1-2005.1)	February t+2: 99 July t+1: 97 February t+1: 96,00 January t+1: 98 September: 01,02 July: 03,05 June: 04	February t+2: 99 July t+1: 97 February t+1: 96,00 January t+1: 98 December: 01 November: 02 October: 03,04	February t+2: 99 November t+1: 96 July t+1: 97 May t+1: 98 March t+1: 00-02 January t+1: 03,04	February t+2: 99 November t+1: 96 July t+1: 97 June t+1: 01 May t+1: 98,00 April t+1: 02-04
<b>Spain</b> (1995.1-2005.1)	September: 99 August: 95 July: 96-98,00,01 June: 02-05	November: 95,98,99 October: 96,97,00,01,03 September: 02,04	January t+1: 95-01 December: 02-04	April t+1: 95,96 March t+1: 97-04
<b>Switzerland</b> (1995.1-2005.1)	August: 97 July: 95,96, 98-02 June: 03-05	November: 98,99 October: 95-97,00-04	January t+1: 95-02 December: 03-04	May t+1: 98,99,03 April t+1: 95-97,00,01 March t+1: 02,04
<b>United Kingdom</b> (1995.1-2005.1)	June: 95-05	October: 02 September: 95-01,03,04	December: 95-04	March t+1: 95-04
<b>United States</b> (1995.1-2005.2)	May: 95-05	September: 02,04 August: 95-01,03,05	February t+1: 99 November: 95-98,00-05	March t+1: 95,96 February t+1: 97-04

\* t+1 means that the first estimate was published the year after the one to which the reference quarter belongs.

### A3. Properties of the Mean Squared Revision

For unbiased preliminary estimates (that is,  $E(R_t) = 0$ ,  $t=1, \dots, n$ , where the symbol  $E(\cdot)$  denotes the expected value),  $MSR$  is the variance of the revision. Taking the square root gives the Root Mean Squared Revision ( $RMSR$ ), which is a suitable measure of accuracy when using a quadratic loss function. The disadvantages of the  $RMSR$  are that (i) while it has a minimum value of zero, it is unbounded, and (ii) it is unrelated to the variation in the latest estimate. Theil (1966) proposed an inequality coefficient ( $U$ ) defined as the positive square root of

$$U^2 = \frac{MSR}{\sum_{t=1}^n L_t^2 / n},$$

which takes account of the variation in the most recent series. The coefficient  $U$  takes the value one when all the latest figures are zero, which is an interesting property if the index is used on growth rates. For, a value of  $U$  between zero and one indicates that the early estimates of growth rates are an improvement over a no-change estimate, while larger values imply poor preliminary estimates. Theil (1961) proposed two alternative decompositions of  $MSR$  and, following Granger and Newbold (1973), we consider the following:

$$MSR = \bar{R}^2 + (S_p - \rho S_L)^2 + (1 - \rho^2) S_L^2,$$

where  $\bar{R}$  is the mean revision,  $S_L$  and  $S_p$  are the standard deviations of the latest and preliminary estimates, respectively, and  $\rho$  is their correlation. Dividing throughout by  $MSR$  gives

$$1 = UM + UR + UD$$

where

$$\begin{aligned} UM &= \frac{\bar{R}^2}{MSR} \\ UR &= \frac{(S_p - \rho S_L)^2}{MSR} \\ UD &= \frac{(1 - \rho^2) S_L^2}{MSR} \end{aligned}$$

The interpretation of these is helped by consideration of the regression model in which the latest estimate is linked to the preliminary estimate as

$$L_t = \alpha + \beta P_t + u_t, \quad (1)$$

for which the least squares estimators are  $\hat{\beta} = \frac{S_{LP}}{S_P^2}$  and  $\hat{\alpha} = \bar{L} - \hat{\beta} \bar{P}$ , where  $S_{LP}$  is the covariance

between  $L_t$  and  $P_t$ . If the preliminary estimates are unbiased,  $\alpha = 0$  and  $\beta = 1$ , so that  $\bar{R}$ , and hence  $UM$ , is zero. That is,  $UM$  gives the proportion of  $MSR$  due to systematic differences between the preliminary and the latest estimates. For  $UR$  we note that

$$S_p - \rho S_L = S_L(1 - \hat{\beta}),$$

so that  $UR$  is the proportion of  $MSR$  due to the slope coefficient in (1) differing from one. Finally, if (1) gave a perfect fit, then  $UD$  would be zero, so  $UD$  can be interpreted as the disturbance proportion of  $MSR$  or that part of the observed revision which is not explained by the mean or slope error. ‘Good’ preliminary estimates will have low values of  $UM$  and  $UR$  and a high value of  $UD$ .

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