Fifty Years of Revisions in the Official Estimates of GDP for the Untied Kingdom and
their Impact on the Interpretation of Post War Economic Performance[*]

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"This treatment, whereby commercial products are valued at market price, government services are valued at cost and unpaid household activities are simply ignored, is not a matter of principle but of practical convenience." (Richard Stone, Noble Memorial Lecture, 8 December, 1984, p. 123)

"Measures of GDP are like sausages, it is better not to see them being made." (to borrow from Bismarck.)

Introduction

The value of GDP for the UK has been reported in official reports since World War II.[1] Over that time there have been changes in the observations for particular years because of a variety of reasons. The most obvious is that real GDP is regularly revised to reflect the most recent price level. Others include new data, new techniques such as chain-linking, and changes in the definition of what is GDP such as what happens when the UK converted to the European System of Accounts (ESA).

Eight years ago, Bill Martin published an article in the Financial Times that was critical of the ONS numbers before 1987. He attributed the cause the 1998 conversion to the ESA(95) In another article he suggested that these numbers could be fixed, but recent events would seem to show his advise has not been followed.

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[*] This is preliminary work and should not be cited without permission.

[1] Ongoing official national accounting in the UK began in early 1940, when an estimate of national income was prepared for internal use. The next year, two economists working for the govern James Meade and Richard Stone completed the first draft of what became the "White Paper" *Analysis of the Sources of War Finance and Estimate of the National Income and Expenditure in 1938 and 1940*. This White Paper became public on April 7, 1941, as a document accompanying the annual budget. Subsequently, through 1951, a White Paper on national income and expenditure was published annually in conjunction with the budget. Beginning in 1952, a *Blue Book* (so called because of the color of its cover) became the annual publication for the national accounts.

We do not propose in this paper to explain the changes in the various versions of annual GDP, the quality of them, or why one is preferred to another. This paper does three things. First, it reports on the compiling of all the official versions of GDP that have been published since 1959 that is now available online. The second part of the paper presents a discussion of what was the impact these numbers had when they were published and if subsequent revisions would have changed the conclusions made at the time. Finally we will discuss the large revisions of last two years and the implication for the current interpretation of post war growth.

Describing the postwar growth in the UK "Standard of Living."

Per capita GDP is the most often measure of comparing the improvement in the standard of living over time. If researchers today ask how has the standard of living of the UK change during the postwar period, they can consult several sources. We present here a list of those sources and how they are not telling the same story.

Office of National Statistics

Starting from 2007Q1 the Office for National Statistics (ONS) publishes every quarter the Quarterly National Accounts (QNA).[2] This publication "contains detailed breakdowns of the components of GDP and key sector accounts aggregates". Starting from 2011Q2 it is also possible to download the reference tables with the time series of the variables used in the reports. Some revision tables that report real-time data (i.e., the data that were available at a given point in time) are also available. The revisions triangles in these tables usually go back a couple of decades. Among the reference tables, up until 2012Q3, there was one called "GDP Revisions Triangles: Real-time Database". This dataset reports real GDP real-time data from 1955Q1 to 2012Q2. The first available vintage is 1961Q2. These data should correspond to seasonally adjusted real GDP data at market prices, but surprisingly they do not always match with the data available in the Economic Trends publications (in particular, between 1975 and 1988). In the QNA, yearly data are available starting from 1948.

Bank of England

Until last month, they published the annual and quarterly data from the 2010 Bluebook and the Q3 report of that year. They are now using the latest series that was most recently published (February 26, 2015.) The most recent data have quarterly data from 1955Q1 to 2014Q4 and annual data from 1700 to 2014, with the 1948 to 2014 observations taken from the latest version of the ONS.

On the top of these data, the Bank of England makes available a spreadsheet called "Real expenditure (long-run)". This dataset reports some selected real variables from 1955Q1 to 2013Q1 at a quarterly frequency. The first vintage available is 1976Q1. The data available correspond to the seasonally adjusted real GDP at market prices figures in the Economic Trends and QNA publications.

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[2] http://www.ons.gov.uk/ons/publications/all-releases.html?definition=tcm%3A77-23645

MeasuringWorth

MeasuringWorth reports UK real and nominal GDP data from 1830 to 2013 at a yearly frequency. Currently, the series from 1948 to the present are taken from The Blue Book of 2011 published by the ONS. The observations of 2012 and 2013 were extrapolated because of how large the recent revisions changed earlier observations. The data pre-1948 are taken from Officer and Williamson (2015).

World Bank (WDI)

The World Bank's World Development Indicator (WDI) dataset reports real and nominal GDP data at yearly frequency from 1960 to 2013. The data are available both in local currency and in PPP $. The WDI lists as sources: "World Bank national accounts data, and OECD National Accounts data files".

IMF (WEO)

The IMF's World Economic Outlook (WEO) dataset gives access to an even more restricted time span: from the WEO website, it seems it is only possible to get data from 1980 on at a yearly frequency. The source of WEO is "ONS National Accounts as of September 19, 2014 (before ESA2010 revisions)".

Maddison

The Maddison Project[3] assembled an annual dataset of real UK GDP in 1990 international dollars from 1800 to 2010 at a yearly frequency. The term international dollars is used to indicate a virtual currency with the same purchasing power of one dollar in the US at a given point in time (1990 in our case). Some selected years are available even before 1800 and go back to year 1.

Penn World Table

The last available version of the Penn World Table[4] reports real GDP at constant 2005 national prices in millions of US dollars, as well as different measures of GDP in purchase power parity. For the UK, data are generally available from 1950 to 2011. To build this dataset different sources have been used, as described in Inklaar and Timmer (2013).

Global Financial Data (GFD)

From the Global Financial dataset[5] it is possible to get data on nominal UK GDP at a quarterly and yearly frequency from 1830 on. Some years are available even before this date and go back to 1664. Global Financial also releases real UK GDP data in 2006 pounds from 1830 on. Global Financial gets its data before 1955 from Mitchell (2003). Subsequent data "are published in both seasonally adjusted and unadjusted formats and are compiled in accordance with the methodology set out in ESA95", but it is not clear what the source is.

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[3] http://www.ggdc.net/maddison/maddison-project/home.htm
[4] http://www.rug.nl/research/ggdc/data/pwt/pwt-8.0
[5] https://www.globalfinancialdata.com

OECD

The OECD keeps a real time dataset with past vintages of key macro variables.[6] In particular, it is possible to find vintages for real and nominal UK GDP series dating back to 1999Q1. The data start in 1960Q1 with the exception of the 2011Q3 vintage whose series start in 1955Q1. These are the same reported in Economics Trends and Quarterly National Accounts.

Comparison

Table 1 compares the annualized growth rate of per capita GDP for each decade in the period found in the different sources. The first row presents observations from the government data that was published the year after the end of the decade.[7] The rest are from current sources. As it is easily seen, none agree with what was the "official" observation of the time. In nearly all cases the growth rates have been revised up. Thus, if a researcher wants to know what people thought the growth of a decade had been the year after it ended, she would find that for the 70's, 80s, and 90s, growth was reported at a slower pace that any of the current sources one might use.

One caveat to keep in mind when comparing the figures in table 1 is that the series collected from Maddison are in international dollars, and the ones from the Penn Tables in 2005 dollars. Still, we think it is worth it to report the growth estimates obtained used these sources since they are so widely used.

The only sources that perfectly match are the data provided by the World Bank after 1980 which mirror the official data distributed by the ONS and OECD. It is surprising that we are not able to match the WEO data with any of the available ONS series, since on the website it is claimed that that is their source.

Source	growth 50-60	growth 61-70	growth 71-80	growth 81-90	growth 91 -00	growth 01 -10
Contemporary	2.19%	2.09%	1.72%	2.83%	2.42%	
World Bank (WDI)		3.14%	1.87%	3.12%	2.52%	0.94%
IMF (WEO)				3.41%	3.26%	0.90%
Global Financial	2.24%	1.44%	1.97%	3.22%	3.26%	0.90%
Maddison	2.22%	2.19%	1.87%	2.86%	2.98%	0.98%
Penn World Table	2.12%	2.28%	1.85%	3.00%	2.69%	0.95%
ONS/2011	2.24%	2.29%	1.85%	3.00%	2.81%	0.81%
ONS/2012	2.60%	2.64%	1.97%	3.41%	3.00%	0.95%
ONS/2015Q1	2.99%	2.53%	1.87%	3.12%	2.52%	0.94%
Max-Min	0.87%	1.70%	0.12%	0.55%	0.74%	0.18%

Table 1: The table compares the annualized growth rate of real per capita GDP for each decade available in the different datasets. Cells colored in red represent the minimum growth rate across sources, whereas yellow cells the maximum

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[6] http://stats.oecd.org/mei/default.asp?rev=1
[7] See below for a discussion of those data.

Our Data

In order to perform a historical analysis of GDP data and its revisions, it is important to have at one's disposal a dataset with consistent GDP estimates over time. In particular, it is important to know which data were available to researchers at a given point in time to understand how the economic situation was interpreted through the lens of those data. To do this, we assemble a new dataset of quarterly and yearly real and nominal UK GDP estimates.

In November 1953, the Central Statistical Office (CSO) started releasing a monthly publication called Economic Trends. The publication was taken over by the Office for National Statistics (ONS) when it replaced the CSO in 1997 and was discontinued in December 2006 when it was substituted by the quarterly electronic release of the Quarterly National Accounts. Economic Trends discussed and released data about some key economic indicators like balance of payments and industrial production. Every quarter they also released an update of GDP data. From the publications of Q1, Q2 and Q4, it was possible to get the GDP estimates of the preceding quarter, as well as a revision of the GDP figures of the past few years. On the contrary, the GDP data released in Q3 included a longer time series (often the whole available time series). Revisions that involved data going back many years would usually performed in this publication.

Before 1981, there are no data for GDP at market prices, although this series can be constructed using the data available. In particular, Economic Trends reports data for real GDP at factor prices,[8] total expenditures, total imports of goods and services, as well as an adjustment factor that equals taxes on expenditure less subsidies valued at constant prices. Thus, it is possible to get real GDP at market prices through two procedures: (1) Taking the column corresponding to GDP at factor prices and adding the adjustment cost term; (2) Taking total expenditures and subtracting imports of goods and services. These two procedures should be equivalent. This is true until 1975.

Starting in 1975, the CSO started supplementing its monthly publications with the Annual Supplement, published in the third quarter of every year. After this, all the monthly publications would just publish data for the past few years, whereas the Annual Supplement published the complete (revised) time series go back to 1948 for annual GDP and to 1955Q1 for quarterly GDP. In the Annual Supplement publications from 1975 to (including) 1977 the GDP tables come with a footnote that reads: "For the years 1948 to 1962 the aggregates differ from the sum of the components". In these years, GDP at factor prices plus the adjustment term is different from total expenditures minus imports of goods and services. Similarly, in 1978, the price index was rebased using 1975 prices. Now, the aggregates differ from the sum of the components for the years 1948 to 1972. This problem disappears in the releases after 1988Q3.

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[8] GDP at factor prices is defined as total final expenditure on goods and services at market prices less imports of goods and services less taxes on expenditure plus subsidies.

Starting in 1981, the Annual Supplement publications added a new column to the GDP tables: GDP at market prices. In the publications before 1988Q3, for the years 1948 to 1972, the figures reported in this column are different from those obtained by summing GDP at factor prices with the adjustment cost and from those obtained by subtracting imports from total expenditures. The monthly publications start reporting GDP at market prices in 1988M1.

Our new quarterly dataset of real GDP is built as follows: Starting in 1961Q3, the first year for which a seasonally adjusted estimate of quarterly real GDP is available, we calculate GDP at market prices from Economic Trends by taking seasonally adjusted GDP at factor prices and adding the seasonally adjusted adjustment factor. We do this for all the years before 1981. Note that, in doing so, we assume that when a certain year does not appear in the publications, it means that the GDP figures for that year were not revised and we keep them unchanged. For the years after (including) 1981, we use the "seasonally adjusted GDP at market prices" column in the GDP at constant prices table in the Annual Supplement and we revise them depending on the quarterly figures published in the Economic Trends publications. In particular, for this period we directly use the "Real expenditure (long-run)" dataset made available by the Bank of England after having manually checked its reliability (see below for more details). We make three corrections to this dataset: (1) The GDP of September 1978 in vintage 1980Q1 was corrected from 26,184 to 28,184; (2) The GDP of 1979Q4 in vintage 1980Q1 was corrected from 27,072 to 28,072; (3) The 1985Q3 erroneously contained a duplicate observation that was deleted; (4) We delete all the observations prior 1998Q1 from the 2013Q2 vintage since there is a break in the GDP data at that point in time and it seems that the price base for the series before and after 1998 might be different. Finally, we complete the dataset with the data made available in the Quarterly National Accounts. This way we obtain a consistent dataset of GDP at constant market prices from 1955Q1 on. Our dataset reports real-time data from 1961Q3 to 2014Q4, with the exception of the quarters between 2013Q3 and 2014Q2 for which we were unable to find the official data, for a total of 210 vintages.

Additionally, we collect data on annual and quarterly nominal GDP. We collect separate data for the two because, for consistency reasons with the real series, for the quarterly series we want to get seasonally adjusted nominal GDP data at market prices. This series is published for the first time in the Annual Supplement to the Economic Trends in 1982. Moreover, from 1982 to 1988 the monthly publications of Economic Trends do not have any reference to this series. In this period, we have one observation in the third quarter of every year.

Annual series for nominal GDP at market prices are available well before 1981. We collect data before 1975 from the National Income and Expenditure published by the CSO and then from the Annual Supplement to the Economics Trends. With these publications at hand, we assemble a dataset of nominal GDP at a yearly frequency from 1952 to 2006. The data are then completed using Blue Book publications and the data available on the ONS website. Every vintage contains data from 1948 to the preceding year.

These data sets are available at: http://www.measuringworth.com/datasets/UKdata/. We only ask that users give a citation to where they got the numbers.

How the vintages of annual and quarterly data change.

A first look at the revisions

Table A1 in the Appendix reports some summary statistics related to the revisions of GDP growth from 1955Q2 to 2014Q3. Note that the first vintage available (i.e., the first edition of the data) is 1961Q3. The first column of Table A1 reports the growth rate the first time the growth rate is available in our data (note that all the GDP figures between 1955Q1 and 1961Q2 are taken from the same vintage). Column 2 reports the number of vintages for which an estimate of the growth for that period is available. Columns 3 to 5 report the standard deviation, maximum and minimum, respectively, throughout the years. Columns 6 and 7 of Table A1 compare the growth rate released in the first publication with the maximum and the minimum growth rate over the vintages, respectively. Similarly, columns 8 and 9 compare the last available vintage (2014Q4) with the maximum and the minimum growth rate published over the years. Finally, the last column compares the growth rates obtained from the last available vintage with those that were released the first time. Note that the numbers reported in columns 6 to 9 indicate how close the first (last) growth rates deviates from the maximum or minimum growth rates in history. The closer to zero the more the first (last) release was close to the maximum or the minimum. Similarly, the numbers in column 10 are a measure of how much the growth rates in the last vintage differ from their first release.

If the revisions were balanced throughout history, meaning that looking at the GDP revisions it is equally likely to see a revision upwards and a revision downwards, we would expect columns 8 and 9 to have the same average and column 10 to have a mean around zero. However, this is not the case. The average of column 8 (maximum minus last release) is 0.66, whereas the average of column 9 (last release minus minimum) equals 0.83. A simple t-test reveals that this difference is significant at a 5% level. This result indicates that on average the last vintage is closer to the maximum growth rate observed throughout the revisions than to the minimum. Similarly, the average of column 10 is equal to -0.20, which means that on average the growth rate in the last vintage is 0.20 percentage points higher than when it was first release. These results are robust to excluding most recent data for which there are less revisions and data before 1961 for which real-time data are not available.

Table 2 compares how the number of recessions as well as the total number of quarters in which the UK economy was considered in recession over the period 1955Q1 and 1995Q4 changes with the release of new vintages. We define recessions and booms using a two-consecutive rule, which is widely used in the literature. In other words, the economy is considered to be in a recession if it registered negative growth for two consecutive quarters. Conversely, it is considered to be in a boom if it experienced two consecutive quarters of positive GDP growth. It is striking to see how these numbers changed over time. The number of quarters of recessions went from 28 in 1996Q4 to a maximum of 31

in 2003Q4 to a minimum of 20 in the 2012Q4 vintage. Similarly, the number of recessions goes from 10 in 1996Q4 to 7 in 2012Q4. This means that if we were to analyze the performance of the UK economy in this time period using the 2012Q4 vintage we would find a much better performing economy than the one depicted in 1996Q4 with 3 less recessions and 2 more years of growth.

Vintage	Number of recessions	Total quarters in recession
1996	10	28
1997	10	29
1998	7	28
1999	7	28
2000	6	28
2001	8	29
2002	8	29
2003	7	31
2004	8	27
2005	8	27
2006	8	22
2007	8	22
2008	8	22
2009	8	23
2010	8	23
2011	8	22
2012	7	20
2013	7	20
2014	7	20

Table 2: Number of recessions and total number of quarters in which the UK economy was in recession between 1955Q1 and 1995Q4 according to the 1996Q4-2014Q4 vintages. Note that, because of data availability issues, for the estimates of 2013 we used the 2013Q1 vintage instead of 2013Q4.

These results, although revealing, do not tell us much about the size of these incongruities. Figure 1 reports a comparison of real GDP growth obtained using the vintages of 1996Q4, 2003Q4, 2012Q4 and 2014Q4. Panels a through d compare the three time series for the decades from the 60s to the 90s. From the figure, one can notice that, although there are some periods in which the growth rates match closely across vintages, there are others as for example the mid-60s, the mid-80s and the 90s in which the revisions importantly changed the behavior of real GDP. The mismatch of growth rates in the 90s is particularly striking.

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(a) 60s

(b) 70s

(c) 80s

(d) 90s
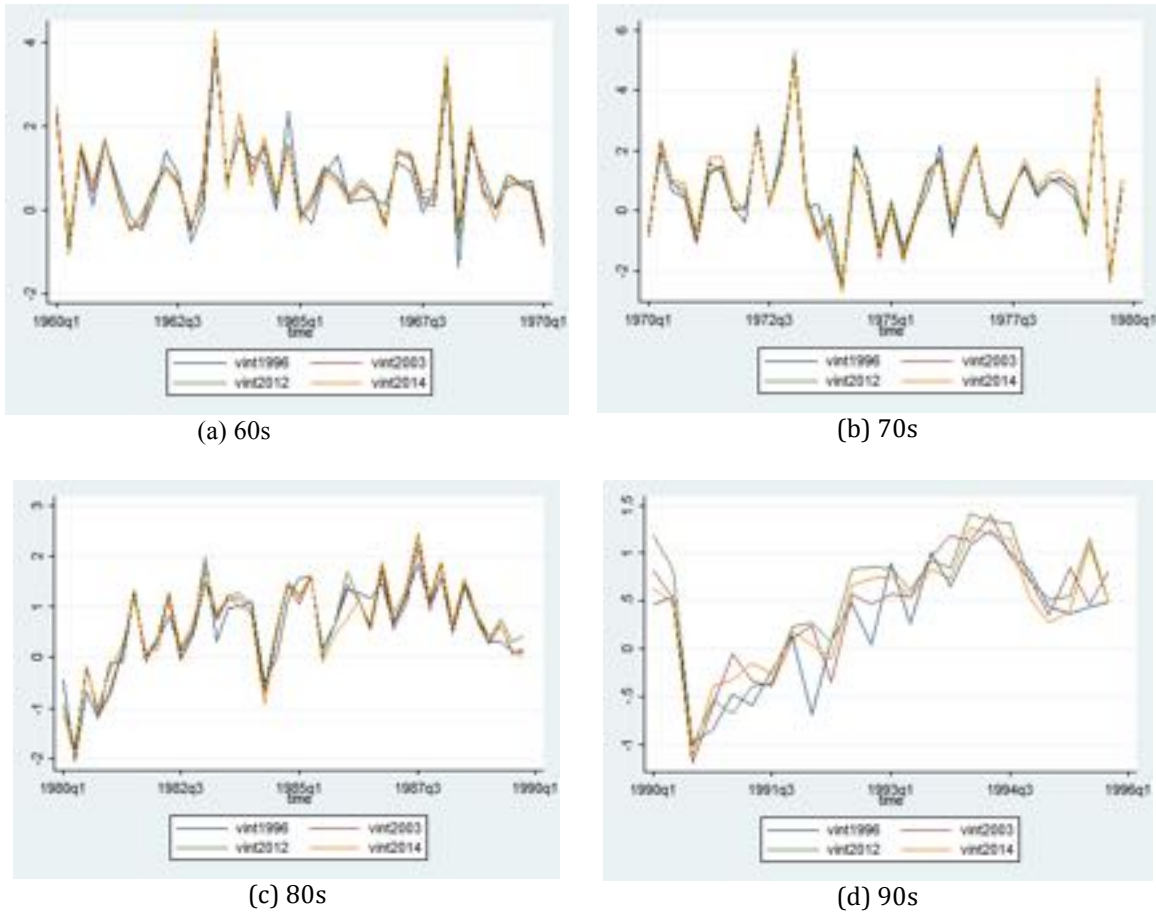
Figure 1: The four panels compare real GDP growth rates obtained using the 1996Q4, 2003Q4, 2012Q4 and 2014Q4 vintages in four decades. Panel (a) reports the comparison for the 60s, panel (b) for the 70s, panel (c) for the 80s, whereas panel (d) for the 90s.

Finally, in the two panels of Figure 2 we plot the standard deviation of real and nominal GDP growth rates across revisions. The standard deviation of the estimates of GDP from 1955 to 1983 fluctuates around 0.4. It then starts gradually decreasing until 1991 when it starts fluctuating around 0.19. On the contrary, the standard deviation of revisions of nominal GDP do not seem to follow any precise pattern and it stays around 0.2 during the whole time window. If anything, it slightly increases throughout the years. This suggests that the reduction in the standard deviation of real GDP revisions is mainly driven by price index calculations that are subject to smaller revisions over time. Notice that chain-weighted GDP estimates were first introduce in the UK in 2003.

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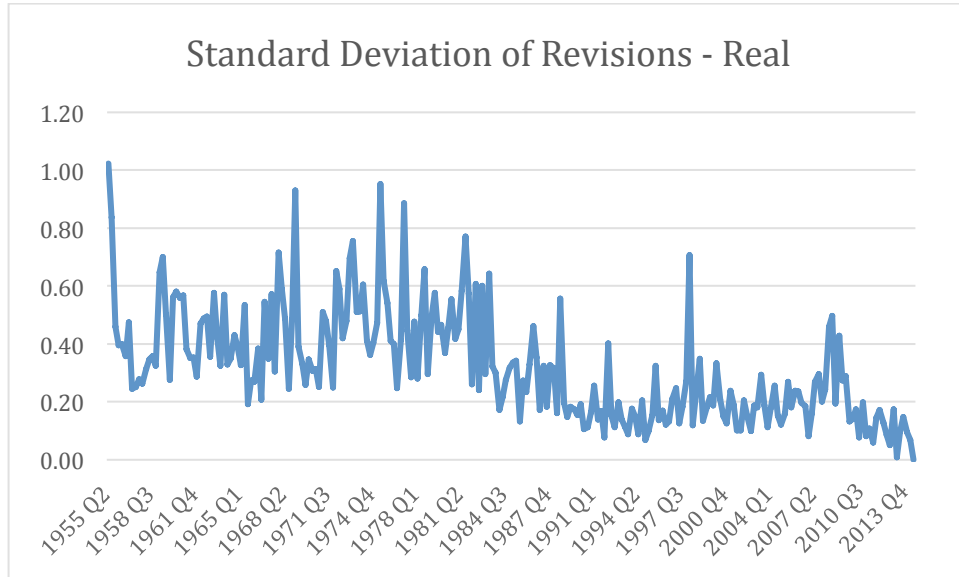
(a) Standard deviation of revisions of quarterly real GDP estimates.
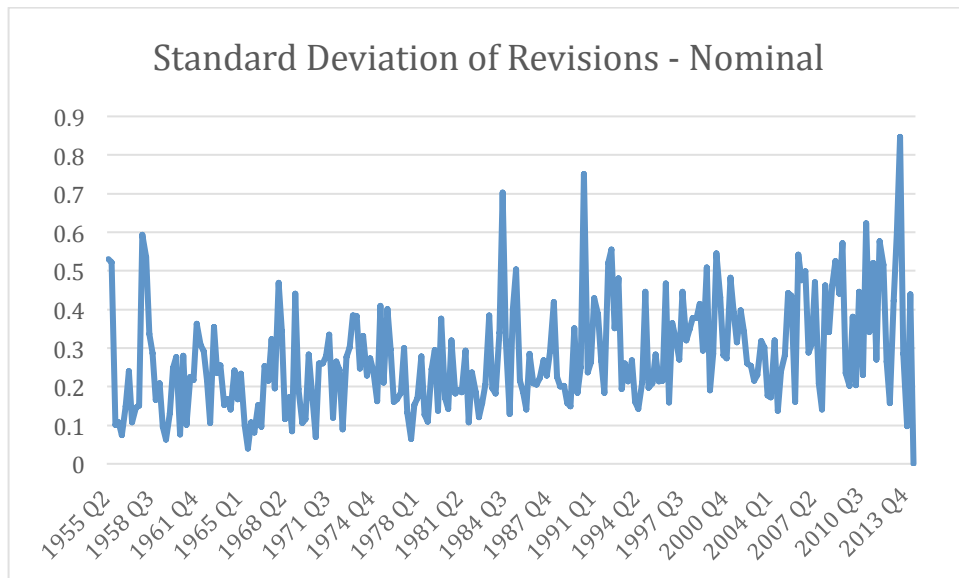
(b) Standard deviation of revisions of quarterly nominal GDP estimates.

Figure 2: The two panels plot the standard deviation of the revisions of quarterly real and nominal GDP at market prices estimates. The standard deviations are calculated using all the vintages available. Panel (a) plots the standard deviation of the revisions of real GDP estimates, whereas panel (b) of the nominal series.

The UK Business Cycle: A comparative Analysis across Vintages

In this section, we are going to analyze Kontolemis and Samiei (2000) (henceforth, KS) and Artis et al. (1997) (henceforth, A97) and see whether the results presented in the papers change when we use newer vintages for the empirical analysis. The two papers are very similar in terms of analysis: both study and compare the behavior of business cycles

in some major European countries. A97 is more descriptive in nature, whereas KS focus on the relationship between the UK business cycles and those of other advanced economies to see whether their choice not to join the European currency union was a sensible one. The importance of business cycle compatibility in the decisional process of British policy makers is highlighted in H.M. Treasury (1997). This policy paper states that the decision whether to join the common currency will be based on five economic tests, the first of which is: "Are business cycles and economic structures compatible so that we and others could live comfortably with euro interest rates on a permanent basis?"

KS conclude that, since the business cycle in the UK is more correlated with the one of the US and Canada than with the one of European continental countries, it made sense for them not to join the currency union and be subject to a monetary policy that would not fit their need of smoothing the business cycles.

This section is structured as follow: First, we describe the two econometric approaches commonly used in the literature for this kind of exercises. Second, we show how these results change when we use different vintages and we compare them with the results obtained in KS and A97. In these papers, the authors use the GDP series of 6 and 12 countries,[9] respectively. We only analyze the relationship between the UK, the US and France. We do this because, unfortunately, vintages of GDP series that dates back more than 20 years are extremely difficult to find for continental European countries.

Business Cycles Analysis

There are two approaches that are mainly used in the literature to analyze business cycles. The first one uses a Hodrick-Prescott (HP) filter and defines cycles as deviations from the trend. Cycles are then compared calculating a simple correlation between the cycles computed this way.

The second one is based on the two-consecutive change rule. Comparing two series obtained this way is a bit more difficult since they are binary series and the results given by a simple correlation would be spurious. In these cases, a correlation measure based on the Pearson's contingency coefficient is usually used. A Pearson's contingency coefficient is defined as:

$$CC = \sqrt{\frac{\hat{\tau}^2}{N + \hat{\tau}^2}}$$

where

$$\hat{\tau}^2 = \sum_{i=0}^{1} \sum_{j=0}^{1} \frac{\left(n_{ij} + \frac{n_{i.}n_{.j}}{N}\right)^2}{\frac{n_{i.}n_{.j}}{N}}$$

where N is the total number of observations, and n_{ij} counts how many times country 1 is in state $i = \{0,1\}$ (0 denotes a recession, whereas 1 a boom) and country 2 is in state

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[9] UK, US, Canada, France, Germany, Italy and UK, US, Canada, France, Germany, Italy, Japan, Spain, Belgium, Netherlands, Ireland, Luxembourg.

$j = \{0,1\}$. Clearly, $n_{i\cdot} = n_{i0} + n_{i1}$. In order to obtain a measure between 0 and 1, CC is rescaled as

$$CC_{corr} = \frac{CC}{\sqrt{0.5}}$$

The higher CC_{corr}, the more the series are correlated. The two-consecutive rule is sometimes preferred to the HP filter approach since the de-trending component of the filter might lead to spurious cycles (see for example King and Rebello, 1993).

Empirical Results

In Table 3, we compare the results we obtained using the same time period as A97 (i.e., 1961Q1:1993Q4) and applying to the US, UK and French real GDP series the two methods described above. Two caveats are to keep in mind. First, A97 does not use quarterly GDP series, but monthly series of industrial production. Since industrial production is often used as a high frequency proxy of GDP and since our GDP series closely matches the moments of the industrial production series reported by A97, we believe that the results should not change much. Second, together with the two-consecutive rule described in the previous Section (rows 3 and 6 of Table 3) we also report an alternative rule that is used in KS (rows 2 and 5). Following this rule, a country receives a 0 if it experienced 2 consecutive quarterly GDP growth below the average growth. It is not clear why the authors decide to use this rule instead of the one described in A97. We think that the traditional two-consecutive rule makes more sense, since it is less country-dependent and less subject to structural changes in the economy of a certain country, as well as GDP revisions. Nevertheless, for comparison, we report the results obtained with both methods. Also, note that A97 do not perform the exercise with the HP filter altogether. For France we are unable to report the results for the whole period since the first vintage available is 1999Q4 and the vintages between 2002Q4 and 2008Q4 do not contain data prior 1990.

	Vintages											A97
	96	97	98	99	00	01	02	03	04	09	12	
US v. UK	0.22	0.20	0.29	0.29	0.36	0.34	0.34	0.36	0.29	0.36	0.36	0.145
US v. UK (mean)	0.21	0.21	0.23	0.05	0.09	0.01	0.01	0.04	0.30	0.14	0.13	
US v. UK (HP)	0.61	0.62	0.62	0.61	0.62	0.62	0.62	0.62	0.60	0.60	0.60	
FR v. UK				0.16	0.38	0.34				0.38	0.36	0.4
FR v. UK (mean)				0.30	0.32	0.38				0.14	0.18	
FR v. UK (HP)				0.42	0.41	0.42				0.44	0.42	

Table 3: Business cycle comparison of UK vs. US and UK vs. France over the period 1961Q1:1993Q4. The comparison was performed using three methods: First, we calculated recessions and booms using a two-consecutive rule and compared the two so-obtained series using the Pearson's contingency coefficient (rows 1 and 4). Second, we apply a two-consecutive rule with respect to the mean (in this case an economy is considered to be in recession if it grows below the period average for two consecutive quarters) and compare the series using the Pearson's contingency coefficient (rows 2 and 5). Finally, we compare the two series identifying business cycles with an HP filter (rows 3 and 6). The last column reports the result of A97.

Table 4 reports a comparison with the results obtained in KS. In this case, the time period taken into consideration goes from 1960Q1 to 1997Q4 and the authors use the GDP series collected by the IMF instead of the ones of the ONS. The authors, use both the HP filter and a 2-consecutive rule relative to the mean to compare the business cycles of continental European countries as well as of the US and Canada with those of the UK. The authors conclude that, based on their analysis, the UK business cycles are more synchronized with the North American ones than with the ones of continental Europe and therefore joining a currency Union with countries like Germany or France might actually hurt the UK economy, since a counter-cyclical monetary policy for continental countries would actually be pro-cyclical for the UK. Two facts emerge from their analysis: First, this result is not in line with the one obtained in A97. The choice of the dataset seems already to play a big role in the final results. Second, although the HP analysis seems to deliver consistent results across vintages and across data sets, the 2-consecutive rule changes over time in an important way. For example a researcher that would study the synchronization of French and British business cycles between 1960Q1 to 1997Q4 using the 1999Q4 vintage would conclude that the UK and the US show a much higher degree of synchronization than France and the UK. However, the same researcher performing the same analysis using the 2012Q4 vintages would end up concluding that business cycles in the UK are as synchronized with the French business cycles as much as they are with the US ones.

	Vintages									
	98	99	00	01	02	03	04	09	12	KS
US v. UK	0.33	0.33	0.4	0.38	0.38	0.40	0.34	0.40	0.40	
US v. UK (mean)	0.20	0.30	0.35	0.45	0.45	0.38	0.32	0.33	0.32	0.63
US vs. UK (HP)	0.63	0.63	0.64	0.64	0.64	0.64	0.61	0.61	0.62	0.58
FR v. UK		0.19	0.36	0.25				0.37	0.38	
FR v. UK (mean)		0.09	0.12	0.27				0.03	0.04	0.22
FR v. UK (HP)		0.46	0.45	0.45				0.50	0.47	0.47

Table 4: Business cycle comparison of UK vs. US and UK vs. France over the period 1960Q1:1997Q4. The comparison was performed using three methods: First, we calculated recessions and booms using a two-consecutive rule and compared the two so-obtained series using the Pearson's contingency coefficient (rows 1 and 4). Second, we apply a two-consecutive rule with respect to the mean (in this case an economy is considered to be in recession if it grows below the period average for two consecutive quarters) and compare the series using the Pearson's contingency coefficient (rows 2 and 5). Finally, we compare the two series identifying business cycles with an HP filter (rows 3 and 6). The last column reports the result of KS.

Factors that might affect revisions

Recessions

Recessions seem to play a big role in the size of revisions. It is as if in periods in which the economy is in disarray, it is more difficult to measure it. We formally test this claim with a regression model of the form:

$$sd_y = \alpha + \beta Rec_y + \gamma Pre84_y + \epsilon_y \quad (1)$$

Where sd_y is the standard deviation of the growth rate in year y calculated throughout all the revisions, Rec_y is a dummy variable that takes value 1 if the UK were in a recession in year y, and $Pre84_y$ is a dummy variable that takes value 1 before 1984. In order to identify the recession periods, we use two approaches. Frist, we use the last available vintage (2014Q4) and apply a two-consecutive rule as in the previous exercises. Second, we extend the dummy to include a period that goes from one year before to one year after the begin and the end of the recession according to the last vintage. We do this because, as seen in Table XX, the number of recessions, as well as their length, has been decreasing throughout the years. Moreover, it is likely that difficulties in collecting data arise already before the economy technically enters in a recession and take some time to disappear. The 1984 dummy is added to the model because, as shown in Figure 2, the standard deviation of real GDP revisions is importantly reduced after 1984. Table 5

reports the coefficients obtained estimating the regression model (1). The results taken together show a clear pattern: in times of recession, the standard deviation of the revisions increases by about 0.065 compared to normal times. This increase is non-negligible since the standard deviation variable has an overall mean of 0.321 and standard deviation 0.188.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Rec_y	0.082**	0.065**			0.106**		
	(0.040)	(0.029)			(0.046)		
Rec_y ext			0.096***	0.051**		0.058	0.127***
			(0.029)	(0.022)		(0.035)	(0.042)
$Pre84_y$		0.255***		0.250***	0.269***	0.265***	
		(0.018)		(0.018)	(0.030)	(0.030)	
cons	0.311***	0.185***	0.298***	0.183***	0.194***	0.195***	0.262***
	(0.013)	(0.013)	(0.014)	(0.013)	(0.022)	(0.022)	(0.026)
N. obs	238	238	238	238	213	213	55
Adj-R2	0.014	0.471	0.041	0.477	0.298	0.289	0.129

Table 5: This table reports the OLS estimates of regression model (1). In columns (1) through (4), the dependent variable is the standard deviation of revisions over all the available vintages. In columns (5) and (6), the dependent variable is the standard deviation of revisions over the five subsequent quarters. Column (7) estimates a regression model similar to (1) but uses annual data. ***: 1%; **: 5%; *: 10%.

We perform two robustness checks. First, we check that our results are not driven by the fact that early observations have been subject to a higher number of revisions and therefore are more likely to have changed over time. We do this by only considering the four years after the first release of the GDP figures and we drop those observations for which we do not have 16 observations (e.g., all the vintages after 2010). The results are reported in columns (5) and (6) and are consistent with the previous analysis.
Second, we use annual data to check whether the positive impact is somehow driven by the way quarterly data are calculated. In this case, the recession dummy takes value one the year of the recession, as well as the year before and after that. The results are reported in column (7). Also in this case, the results are consistent with the previous analysis: being in a recession increases the variation of GDP revisions.

The Recession of the Early 60s – A Case Study
In this section, we analyze whether these changes would have had any impact on public debate or by policy makers' decisions, if the new data had been available at that time. In the next section, we are going to analyze more in details one of these events.

The first decade we study is the one of the 60s. As the analysis in the previous section shows, there have been some important revisions of the GDP growth rates between 1962

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and 1967 throughout the years. Table 6 reports how the recession/expansion quarters changed over the years in this time window. An expansion is denoted with a one, whereas a recession with a 0. Turning points are identified using a simple two-consecutive change rule, which is the rule usually used in these kind of analysis and by policy makers. Two consecutive contractions of the economy start a period of recession, whereas two consecutive quarters of growth start a period of expansion. Table 6 clearly shows that a researcher, who wanted to study the UK economy in the 60s using the available data, would be confronted with a dilemma: Which vintage correctly captures the state of the economy at that time? Were the years 1962-1963 a period of recession of expansion? In order to answer this question we look at newspaper articles. Those years were characterized by uncertainty due to delicate economic situation in the United States.

However, the general sentiment in the UK was one of a sound growing economy. As one can read in an article published in The Times on July 12, 1962 and titled "Treasury Confident of Steady Growth - Output, Exports, and Home Demand All Rising":[10]

> "Some discussion is obviously now going on inside the Cabinet on the issue of reflation. On the one side, the Treasury have concluded after their latest reappraisal of trends that there is no need to apply a stimulus to the economy at present. On the other side, some influential voices are suggesting that a little discreet priming of the pump might be timely.
>
> For the time being the Treasury view is no doubt likely to prevail (...)"

We now want to check whether these big changes are exclusively driven by revisions of the price index. Table 7 reports the growth rate of nominal GDP for some selected vintages. Unfortunately, because of data availability we were not able to use the same vintages we used in table 7. Nevertheless, the estimates reported show some important variation in the nominal series, as well. We colored in yellow the quarters with a negative growth rate.

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[10] The whole article is reported in Appendix.

	1964Q4	1965Q4	1970Q4	1975Q4	1981Q4	1986Q4	1991Q4	2014Q4
1960Q1	1.13	1.74	1.85	1.18	1.18	1.36	2.15	2.46
1960Q2	0.62	0.06	-0.43	-1.18	-1.51	-1.65	-0.65	-0.79
1960Q3	0.23	0.19	0.46	1.22	1.49	1.59	1.44	1.58
1960Q4	0.66	0.51	0.69	1.57	1.89	1.18	0.13	0.61
1961Q1	1.95	2.57	2.45	1.94	1.80	2.01	1.59	1.62
1961Q2	0.68	0.26	0.10	0.02	-0.41	0.17	0.67	0.40
1961Q3	0.25	0.25	0.39	0.08	0.54	0.15	-0.14	-0.51
1961Q4	-0.64	-0.59	-0.18	-0.89	-0.86	-0.85	-0.49	-0.18
1962Q1	-0.63	-0.62	-0.36	0.28	-0.07	0.09	0.27	0.48
1962Q2	1.75	2.26	1.70	1.89	1.98	2.10	1.39	0.95
1962Q3	0.17	-0.23	-0.19	-0.52	-0.18	-0.18	0.90	0.61
1962Q4	-0.48	-0.14	-0.04	0.20	0.07	0.00	-0.79	-0.40
1963Q1	-0.62	-0.15	-0.48	-0.75	0.27	0.47	-0.09	0.55
1963Q2	4.16	4.67	4.21	4.98	3.70	3.62	3.95	4.29
1963Q3	0.69	-0.19	0.40	0.35	-0.23	-0.08	0.76	0.47
1963Q4	3.59	3.20	2.78	1.97	2.55	2.46	1.75	2.30
# recession quarters	4	8	6	0	3	2	4	2

Table 6: The table reports real GDP growth rates in the early 60s for some selected vintages. The cells colored in red represent periods that would be considered as a recession according to the two-consecutive rule.

	1982Q3	1988Q3	1991Q3	1999Q3	2001Q3	2014Q4
1960Q1	0.48	1.23	1.35	1.49	1.51	1.63
1960Q2	-0.21	0.91	0.72	0.54	0.54	0.94
1960Q3	1.51	1.22	1.34	1.22	1.26	1.48
1960Q4	2.87	1.83	1.85	2.04	2.04	2.12
1961Q1	2.41	2.06	2.10	2.22	2.19	2.36
1961Q2	-0.24	0.25	0.06	-0.30	-0.28	-0.42
1961Q3	3.98	2.94	3.52	3.36	3.35	3.44
1961Q4	-1.49	0.10	-1.13	-0.98	-0.97	-1.05
1962Q1	1.44	0.42	1.36	1.47	1.50	1.16
1962Q2	2.68	3.47	2.81	2.48	2.47	2.46
1962Q3	0.55	0.69	1.00	0.91	0.88	1.02
1962Q4	0.72	0.38	0.38	0.46	0.46	0.53
1963Q1	0.30	-0.67	-0.56	0.04	-0.11	-0.53
1963Q2	4.13	4.79	4.68	5.09	4.95	5.27
1963Q3	0.99	1.73	1.71	1.35	1.32	1.40
1963Q4	3.36	2.84	3.02	3.19	2.92	3.08
# negative growth	3	1	2	2	3	3

Table 7: The table reports nominal GDP growth rates in the early 60s for some selected vintages. The cells colored in yellow represent periods of negative nominal growth.

Elections

Periods just before and after elections might be sensitive periods from a data release point of view. Often the electoral debate revolves around the state of the economy, how the current government performed from an economic point of view and how the incumbent party will improve the economy of the country. In these periods, two forces might affect the reliability of the data. On the one hand, the government in charge might pressure statistical offices to release data that make them look favorable. On the other hand, the private sector might have an incentive to manipulate data or delay their delivery in such a way that would help their preferred candidate. On the other hand, around the elections, statistical offices are also under more public scrutiny and this might increase the reliability of the data, since it might be more costly for them to release estimates that change importantly over time.

In this section, we empirically explore these conjectures by analyzing the real-time data and their revisions two quarters before and after general elections in the UK from 1961 on. The first column of table 8 reports GDP growth two quarters before and two quarters after the elections, as well as the elections quarter. The cells corresponding to the quarter in which the elections were held are colored in yellow if the Labour party won the elections, and in red when the conservatives won. Column 2 reports the difference between the real-time data and the maximum growth rate across vintages. Column 3 reports the difference between the minimum growth rate across vintages and the real-time figures. Finally, Column 4 reports the difference between the real-time data and the last available vintage (2014Q4). Numbers close to zero in Columns 2 to 4 indicate that real-time data were close to the maximum, minimum and to the last growth estimate, respectively. Note that figures in Columns 2 and 3 can never be smaller than zeros, whereas numbers below (above) zero in Column 4 indicate that the last estimate is higher (lower) than the one given in real-time.

From a careful analysis of the reported numbers, two facts emerge. First, before 1997 it is possible to identify a clear pattern: Elections that were won by the Labour party are characterized by real-time GDP growth figures that are skewed towards the maximum of the vintage distribution. On the other hand, elections won by conservative are characterized by real-time growth figures that are skewed towards the minimum. Second, these patterns seem to disappear after 1997. The elections that were held after the mid-90s do not show any trend and the numbers are less volatile. This is reassuring because it suggests that GDP estimates are more precise and less subject to changes over time and that the whole data collection is less subject to political influence. If anything, the real-time estimates around the elections in the last three decades look quite conservative and they tend to underestimate the figures given in subsequent revisions.

	Real-time growth	Max-First	First-Min	First-Last		Real-time growth	Max-First	First-Min	First-Last
1964Q2	0.74	1.44	0.54	-1.01	1982Q4	2.02	0.52	1.56	1.33
1964Q3	1.22	0.00	2.00	0.85	1983Q1	1.40	0.94	0.57	-0.33
1964Q4	2.35	0.31	0.82	0.80	1983Q2	-1.79	2.68	0.00	-2.68
1965Q1	1.17	0.24	1.67	1.45	1983Q3	0.69	1.18	1.02	-0.48
1965Q2	-2.24	2.56	0.02	-2.32	1983Q4	2.25	0.00	2.17	1.26
1965Q3	1.22	0.27	0.58	0.38	1986Q4	1.36	1.57	0.45	-0.52
1965Q4	1.67	0.00	1.42	1.05	1987Q1	1.44	0.00	1.15	0.60
1966Q1	1.48	0.00	1.74	1.33	1987Q2	0.19	1.39	1.04	-1.19
1966Q2	-0.83	2.12	0.13	-1.39	1987Q3	2.49	0.09	0.72	0.05
1966Q3	-0.12	0.71	0.04	-0.48	1987Q4	1.03	0.36	1.86	-0.14
1969Q4	2.08	0.00	1.97	1.56	1991Q4	-0.12	0.36	0.03	-0.30
1970Q1	-2.56	2.17	0.00	-1.87	1992Q1	-0.84	1.18	0.09	-0.88
1970Q2	2.03	1.09	0.51	-0.35	1992Q2	-0.15	0.32	0.20	-0.04
1970Q3	0.38	1.30	0.40	-0.61	1992Q3	0.06	0.76	0.00	-0.61
1970Q4	1.04	0.30	0.85	0.11	1992Q4	0.28	0.58	0.24	-0.45
1973Q3	1.47	0.00	2.49	2.49	1996Q4	1.14	0.19	0.82	0.82
1973Q4	-0.91	0.79	0.88	-0.48	1997Q1	0.95	0.32	0.47	0.47
1974Q1	-1.38	0.54	1.35	1.35	1997Q2	1.00	0.20	0.34	-0.14
1974Q2	1.86	1.30	1.05	0.42	1997Q3	0.93	0.10	0.52	0.21
1974Q3	1.47	1.05	0.84	0.84	1997Q4	0.32	1.02	0.00	-1.02
1974Q1	-1.38	0.54	1.35	1.35	2000Q4	0.41	0.29	0.18	0.11
1974Q2	1.86	1.30	1.05	0.42	2001Q1	0.46	0.90	0.00	-0.67
1974Q3	1.47	1.05	0.84	0.84	2001Q2	0.45	0.32	0.33	-0.32
1974Q4	-0.17	0.29	2.69	1.34	2001Q3	0.46	0.21	0.14	-0.08
1975Q1	0.56	0.00	2.28	0.50	2001Q4	0.00	0.54	0.00	-0.31
1978Q4	-0.78	2.16	0.00	-1.76	2004Q4	0.68	0.13	0.28	0.28
1979Q1	-1.66	1.19	0.87	-1.17	2005Q1	0.37	0.38	0.18	-0.33
1979Q2	1.23	4.26	0.00	-3.16	2005Q2	0.49	0.81	0.04	-0.53
1979Q3	-2.08	0.99	1.38	0.05	2005Q3	0.41	0.62	0.01	-0.62
1979Q4	0.45	1.52	1.07	-0.59	2005Q4	0.56	0.79	0.07	-0.79

Table 8: The table reports the real-time growth rate around general elections between 1964 and 2005 together with some summary statistics that compare the real-time figures with those released in subsequent revisions. Red rows represent general elections won by conservatives, whereas yellow rows represent general elections won by the Labour party.

General Election of 1992 – A case study

We now analyze more closely the growth estimates in the early 90s. As it is shown in Figure 1, the period 1990-1995 has been subject to many reviews throughout the years.

Table 9 shows how the periods considered of recession/expansion changed throughout the years. Although the changes are less dramatic than the ones described for the 60s, they are nevertheless of big importance in explaining the public debate in that period. On April 9, 1992, the UK held a general election. Articles in the news show that a big part of the electoral campaign rotated around the recession. An article published on February, 16 1992 on The Times and titled "Recession Will Win Us Election Says Kinnock" reports:

"Neil Kinnock has told Labour leaders that the continuing recession, rather than health or education, will put them in power, and that is what they must now concentrate on. (...) Kinnock said Labour's new message must be that the country could not afford a fourth Tory term. New economic figures to be published on Thursday will confirm that Britain is in the longest recession since the war. (...)

Tory ministers have been shaken by the fresh evidence of continuing recession, contradicting official predictions that it would end before Christmas. Unemployment reached 2.6m last month and is set to rise further."

Table 9 shows that such electoral rhetoric could have not existed if GDP was measured as in the later vintages. Actually, a researcher who analyzed the 1992 elections using the last data available would have a hard time interpreting these speeches.

	1995Q4	2000Q4	2005Q4	2014Q4
1990Q1	0.46	0.76	0.79	0.63
1990Q2	0.54	0.48	0.53	0.48
1990Q3	-0.99	-1.25	-1.19	-1.10
1990Q4	-0.83	-0.54	-0.58	-0.39
1991Q1	-0.47	-0.08	-0.05	-0.31
1991Q2	-0.57	-0.62	-0.34	-0.15
1991Q3	-0.23	-0.12	-0.39	-0.25
1991Q4	0.11	0.19	0.11	0.18
1992Q1	-0.65	-0.06	0.34	0.04
1992Q2	0.05	-0.25	-0.35	-0.11
1992Q3	0.48	0.56	0.57	0.67
1992Q4	0.09	0.48	0.46	0.73
1993Q1	0.82	0.53	0.67	0.76
1993Q2	0.55	0.57	0.55	0.53
1993Q3	1.04	1.01	0.97	0.83
1993Q4	0.64	1.06	1.18	0.73
1994Q1	1.13	1.00	1.10	1.27
1994Q2	1.26	1.26	1.39	1.19
1994Q3	0.98	1.43	0.98	1.15
1994Q4	0.70	0.85	0.75	0.53

Table 9: The table reports real GDP growth rates in the early 90s for some selected vintages. The cells colored in red represent periods that would be considered as a recession according to the two-consecutive rule.

Recent revisions of the ONS series

The nominal value for GDP per capita in all the ONS reports (through last year) for the year 1948 has been between £235 and £240. The real value changes every four or five years when there is a new base year. When adjusting the 1948 value using the deflator from the new base year, the value for *that year* has changed very little between the over the 50 years of reports averaging about £6,700 (in 2011 pounds) throughout the years. In the 2012 Bluebook report no change in the nominal value of the 1948 GDP per capita, but the real value decreased £840, or 15%.[11]

On the 5th of February 2013, the ONS issued a statement explaining that "historical GDP data pre-1997 was recalculated using a top level CPI series. This was in order to bring the estimates into line with the methodological changes introduced for the period since 1997." Producing a CPI before 1987 - where individual price data is unavailable - is extremely challenging and requires some form of modelling using a variety of assumptions." The statement went on to say that further work as been undertaken to produce a modelled CPI back to 1950 and "Any conclusions from this work would not be ready until at least the Blue Book of 2014."

The impact of this new value was to increase the annualized per capita growth rate for 1948 to 2011 from 2.03% to 2.27%, or close to a quarter of a point increase in growth per year for over 60 years. Decreasing the number of years it takes to double by four years to 31.7. There were hardly any changes in the nominal annual observations; thus, we can assume that this revision was based on changes in the deflators used. As a reference, the latest estimate of this statistic for the US is 2.01%.[12]

Then last fall, the ONS published the following "**6 October 2014, 3:30pm --** A production error has been identified in the processing of estimates of pre-1997 GDP and some components… Series from 1997 onwards are unaffected. ONS apologises for any inconvenience caused."

Later that month, they published new annual and quarterly series. These numbers incorporated methods changes to bring them in line with the ESA2010. The latest numbers are different again, but this time there is a change in the *nominal* values. While the 1948 observation is only 97% of the pre mistake level, by 1957 they are roughly the same. From then on they are increasing larger to 8% more by 1993 and then up and down from then on with the 2012 new observation also 8% larger.

Comparing the latest revisions of real GDP with the pre mistake data also shows a different difference. The 1948 real GDP per capita (in 2011 pounds) at £6,440, which is about 6% less than the average values before the "production error." While this might be explained by many changes in definitions during the last couple of years, it is interesting to note that by 1957, the new series is equal to the earlier series and then up 7% larger from then on.

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[11] Each year after 1948, the decrease was about .3% less and by the 1990s there was very little difference.

[12] The US has real GDP has grown faster than the UK in the post war period by over three quarters a percent, but the growth in population has been even faster.

Conclusions

If you are studying the UK economy of a particular era of the post WWII, then it is best to see what the measures were that people were observing at that time. Our data allows you to do that. We have shown that the revisions over time have been subject to important changes. Even more importantly, we have shown that data are subject to more changes around events that are of more interest for researchers, that is elections and recessions.

We also show that GDP data should be used with caution for policy decisions. During the debate around joining the common currency in the UK during the late 90s, what seems to be one conclusion then might seem the exact opposite in just ten years using a revised GDP series. This is of some interest not only for policy related decisions but also for securities that are somehow related to macro measures like GDP or inflation, like GDP-linked bonds widely discussed in Greece at present.

As for today, any research using the post war GDP series as reported by the ONS, for the last two years needs to be re-done as these data had a production error. Clearly the results are suspect until checked.

Even after the production error has been corrected, economic historians need to ask if they accept the recent new historic series of UK GDP that are now different at both the nominal and real level. While it is not clear where all these changes come from, converting to ESA95, the creation of a derived CPI for the year before there was one and then converting again to ESA2010, certainly are factors. The definitions in ESA2010 may make sense for measuring the GDP of 2015, but is it the best definition for the GDP of 1948? Another question is does it make sense to link these new series with pre 1948 data and create long-term series that extend back into the 19th century and earlier? We do not have an answer.

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Appendix

Finance, Industry, and Commerce

Communications for the City Office should be addressed to 15, George Street, E.C.4 (Telephone, Mansion House 4702 & 1171 and Mincing Lane 6654). All other communications to THE TIMES should be sent to Printing House Square, E.C.4 (Telephone, Central 2000).

TREASURY'S VIEW OF FUTURE EXPANSION

LOOKING FOR THE UPTURN

By Our City Editor

Wall Street has so dominated thinking in recent weeks that any assessment of the British outlook is likely to be distorted. When, in spite of all the transatlantic gloom, the Chancellor and other Treasury officials persist in talking about the potential growth in the economy and are plainly sticking to their earlier estimates of the demands on the economy, it is time for a closer look at prospects here. The picture painted at Budget time was that the real danger this year was from the potential pressure of demand and the Budget itself had a strict deflationary bias about it. The question is whether that should now be re-assessed.

REASONABLE RATE

The official view was again stressed by Sir Edward Boyle, the financial secretary of the Treasury, in Friday's debate on the Finance Bill. The Chancellor, he said, was quite confident that the economy was going to expand "at a reasonable rate" over the financial year. He added that elements of expansion were still operating strongly and he saw no reason to go back on the forecast of higher consumer spending given in the Budget. But this is by no means the same thing as saying that the growth is coming from the same sources as expected or that the timing is still the same. In point of fact both have changed. The Treasury may still stick to its idea of a growth in consumer spending in the long run; but the start of the expansion has been delayed by at least three months. Hire-purchase business has not revived as expected and both the weather and the rise in many consumer prices has reduced consumer spending in general. Nevertheless, a recovery may now be in the making. Shop sales point to it, and the combination of

higher wage rates and stable prices in the coming months suggest that it will continue.

If this takes place, if Government spending goes on rising and if exports go on expanding even at the slow rate of recent months, the economy should certainly reflect it in higher activity. But two elements not fully allowed for in the Budget have to be taken into account. These are the movement in stocks and the trend of capital spending by industry. The first has declined further than expected and the second, under the influence of Wall Street and other factors, is still impossible to assess with any real confidence. The movement of stocks continues to be the most illusive element in short-term economic analysis. Under the pressure of demand in recent months, according to Sir Edward Boyle, manufacturers have reduced their stocks at a faster rate than at any time since 1955. As soon as this process was halted, he said, production would be considerably stimulated. It is possible that the heavy run down of stocks explains the sluggishness of industrial output so far this year. It may suggest, as it plainly does to the Government, that once de-stocking comes to an end, the turn-round in industrial production may be quite sharp.

CAPITAL PLANS

This leaves one factor still unknown—industry's future capital plans. Spending on capital projects still seems to be moving downwards. It is easier to know why (last July's measures and the recent trend of Wall Street are the prime factors) than to be sure how long it will go on. Although it is not an important element in raising the general level of demand in the economy, it happens to be one of the keys to future industrial growth. It is unlikely on its own to falsify the Government's expectations of expansion in the next six months. But in the fight for a higher rate of growth in the future, it remains, along with exports, one of the main unknowns.

Source: The Times – July, 9 1962

TREASURY CONFIDENT OF STEADY GROWTH

OUTPUT, EXPORTS, AND HOME DEMAND ALL RISING

From Our Political Correspondent

Some discussion is obviously now going on inside the Cabinet on the issue of reflation. On the one side, the Treasury have concluded after their latest reappraisal of trends that there is no need to apply a stimulus to the economy at present. On the other side, some influential voices are suggesting that a little discreet priming of the pump might be timely.

For the time being the Treasury view is no doubt likely to prevail. The provisional decision seems to be firmly against any relaxations in the near future. This judgment has been formed after taking due note of the nervous mood of some industrialists, who are conscious that they are working under capacity, and also after a cool assessment of American economic prospects.

As the Treasury see it, the prospects are at present much more hopeful than some parts of industry, and some City and economic commentators, believe. But much obviously depends on whether the Chancellor of the Exchequer's judgment of export opportunities that lie ahead will be fulfilled.

U.S. FIGURE FALLS

Production, which had stagnated towards the end of last year, has started to rise slightly. Every month this year so far, on a seasonally adjusted basis, exports have increased. In the three months March to May, compared with December to February, exports were up overall by about 4 per cent. Exports to western Europe were up by 4 per cent and to the sterling area by 5½ per cent. But there was an accompanying fall in exports to North America of 8 per cent, which is explained by the Canadian economic situation. The point is also being made that the export figure between March to May benefited little from ship and aircraft sales.

Between the first quarter of 1962 and the last quarter of 1961 there has also been a hopeful improvement in invisible exports. The last few years have shown dramatic falls here, and in the last quarter of 1961 the figure was minus £16m. In the first quarter this year it was plus £54m. These are actual figures and admittedly may be misleading, but it is calculated that on a seasonally adjusted basis the real improvement on the two quarters must be about £50m.

FIXED INVESTMENT

The Treasury are not sharing in the depression about the current level of fixed investment. In manufacturing industry during the first quarter of this year, it was 3 per cent less than in the last quarter of 1961, but before any stimulation were applied here, it is argued, there would be need to show that total investment is down. On the Treasury view, the fall in manufacturing and private investment has been balanced by public investment.

Another important aspect of investment is stocks. Some new figures have been offered here. In the third quarter of last year investment in stocks increased by £12m, and in the fourth quarter by £78m. In the first quarter of 1962 there was a drop of £44m.; the inference is therefore drawn that there has already been considerable destocking, and that the process will continue. Before long restocking must apply a stimulus.

Personal consumption has been rising slightly since the beginning of the year, and it is believed that there will prove to have been a substantial rise during June. The reduction of hire purchase initial deposits should have had this effect. It is calculated that the reduction will increase domestic spending at the rate of £60m. to £80m. a year.

This single factor is reckoned by the Treasury to be a cogent argument against the Government's rushing in to stimulate home demand to take up any slack in the economy. In addition, it is expected that the tendency of retail prices to rise in the past 12 months will be halted, and perhaps reversed, by the late summer. (The main factor in the rise was the price of vegetables.) This, coupled with wage and salary increases, is expected to stimulate a rise in consumption.

CONSUMPTION UP

Looking ahead, the Treasury expect exports to rise by about 5 or 6 per cent on a comparison between the first quarter of this year and the first quarter of 1963, and the calculation is that personal consumption should be up by about 4 per cent over the 12-month period. Overall investment is expected to alter little.

But trends in the United States economy remain the source of much doubt. The American recovery is seen to have lost much of its momentum, but expansion is expected to continue for the rest of this year, bringing benefit to Commonwealth primary producers. It is also a factor in the Treasury's calculations that the Kennedy Administration is more likely than its predecessor to take prompt corrective action if a recession were to threaten.

If need be, the Treasury has the weapons of the economic regulator ready to bring into use if home demand needs a fillip. This was applied last July as a surcharge; it can also be applied as a rebate that would put £200m. into the economy. There are also the weapons of Bank rate and special bank deposits lying ready to hand if quick action were to be needed.

WORKERS' SECURITY

It follows that from the Treasury point of view no major economic announcements are foreshadowed before Parliament rises at the beginning of August for the summer recess. On the other hand, it is thought the Prime Minister and the Chancellor will lose no time in announcing the Lunn Boo measures (consumer protection and security for workers), once the Government's decision has crystallized. Much thought is being given inside the Cabinet to these subjects at the moment, along with proposals for the revaluation of vocational professions, in the hope that the second phase of the incomes policy can be given some substantial support. But it is clear that no firm decisions have yet been taken.

Ministers obviously want it to be widely understood that there is nothing they can do at the moment of a very spectacular kind. They would, for instance, like to see interest rates on house mortgages come down, but they admit it will have to be a slow process, because interest rates affect much more than house ownership.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	First avail.	# of vint.	s.d.	Max	Min	Max - First	First - Min	Max - Last	Last - Min	First - Last
1955Q2	-2.99	188	1.02	0.32	-3.01	3.31	0.02	0.20	3.13	-3.11
1955Q3	4.25	188	0.84	4.25	1.22	0.00	3.03	2.20	0.83	2.20
1955Q4	-0.24	188	0.46	1.42	-0.66	1.66	0.42	1.96	0.12	0.30
1956Q1	0.43	188	0.40	1.09	-1.09	0.66	1.52	0.00	2.18	-0.66
1956Q2	1.70	191	0.40	1.70	-0.30	0.00	2.00	1.91	0.09	1.91
1956Q3	-1.42	191	0.36	0.13	-1.42	1.55	0.00	0.24	1.31	-1.31
1956Q4	1.01	191	0.48	1.99	0.27	0.98	0.74	1.55	0.17	0.57
1957Q1	0.91	191	0.24	2.14	0.91	1.23	0.00	0.19	1.04	-1.04
1957Q2	1.10	191	0.25	1.10	-0.53	0.00	1.63	1.07	0.56	1.07
1957Q3	-1.40	191	0.28	-0.52	-1.69	0.88	0.29	0.13	1.04	-0.75
1957Q4	-0.89	191	0.26	0.67	-0.89	1.55	0.00	0.47	1.08	-1.08
1958Q1	1.41	191	0.31	2.07	0.67	0.66	0.74	0.00	1.40	-0.66
1958Q2	-1.52	209	0.35	-1.46	-2.70	0.06	1.18	0.83	0.40	0.77
1958Q3	2.44	209	0.36	2.85	1.65	0.42	0.79	0.64	0.56	0.23
1958Q4	-0.17	209	0.32	0.47	-0.62	0.64	0.45	0.40	0.70	-0.24
1959Q1	-1.80	209	0.65	1.35	-2.15	3.15	0.35	0.81	2.69	-2.34
1959Q2	5.40	209	0.70	5.47	1.49	0.07	3.92	3.84	0.14	3.78
1959Q3	0.34	209	0.50	2.23	0.24	1.88	0.10	0.10	1.89	-1.78
1959Q4	2.07	209	0.28	4.15	1.91	2.08	0.16	1.59	0.65	-0.49
1960Q1	1.20	209	0.56	2.46	-0.52	1.25	1.72	0.00	2.98	-1.25
1960Q2	0.97	209	0.58	1.19	-1.76	0.21	2.74	1.98	0.98	1.76
1960Q3	-1.43	209	0.56	1.80	-1.69	3.22	0.27	0.22	3.27	-3.01
1960Q4	0.98	209	0.57	1.89	0.11	0.91	0.87	1.28	0.50	0.37
1961Q1	1.05	209	0.38	2.72	0.02	1.68	1.03	1.10	1.61	-0.58
1961Q2	1.48	209	0.35	1.83	-0.43	0.35	1.91	1.43	0.82	1.08
1961Q3	-0.89	208	0.35	0.55	-0.89	1.44	0.00	1.07	0.37	-0.37
1961Q4	-0.89	207	0.29	0.00	-1.03	0.89	0.15	0.18	0.85	-0.71
1962Q1	-1.60	206	0.47	0.66	-1.95	2.26	0.35	0.18	2.43	-2.08
1962Q2	2.57	205	0.49	2.75	0.93	0.17	1.64	1.80	0.02	1.63
1962Q3	-0.03	204	0.50	0.90	-0.77	0.93	0.73	0.29	1.37	-0.64
1962Q4	-0.63	203	0.36	1.05	-0.79	1.68	0.16	1.45	0.38	-0.22
1963Q1	-2.00	202	0.58	1.04	-2.00	3.04	0.00	0.49	2.55	-2.55
1963Q2	5.02	201	0.42	5.11	3.43	0.09	1.60	0.82	0.86	0.74
1963Q3	0.18	199	0.32	0.76	-0.27	0.58	0.45	0.29	0.74	-0.29
1963Q4	4.42	199	0.57	4.54	1.41	0.11	3.01	2.23	0.89	2.12
1964Q1	-1.00	198	0.33	1.40	-1.00	2.40	0.00	0.83	1.57	-1.57
1964Q2	0.74	197	0.35	2.18	0.20	1.44	0.54	0.42	1.55	-1.01
1964Q3	1.22	196	0.43	1.22	-0.78	0.00	2.00	0.85	1.15	0.85
1964Q4	2.35	195	0.39	2.66	1.53	0.31	0.82	1.11	0.02	0.80

1965Q1	1.17	194	0.33	1.41	-0.50	0.24	1.67	1.69	0.22	1.45
1965Q2	-2.24	193	0.54	0.32	-2.26	2.56	0.02	0.24	2.34	-2.32
1965Q3	1.22	192	0.19	1.50	0.64	0.27	0.58	0.65	0.21	0.38
1965Q4	1.67	191	0.27	1.67	0.26	0.00	1.42	1.05	0.37	1.05
1966Q1	1.48	190	0.27	1.48	-0.26	0.00	1.74	1.33	0.41	1.33
1966Q2	-0.83	189	0.39	1.29	-0.96	2.12	0.13	0.73	1.52	-1.39
1966Q3	-0.12	188	0.21	0.59	-0.17	0.71	0.04	0.23	0.53	-0.48
1966Q4	0.35	187	0.55	1.32	-0.45	0.97	0.80	1.74	0.02	0.77
1967Q1	1.98	186	0.35	2.22	0.52	0.24	1.46	0.85	0.85	0.61
1967Q2	-0.28	185	0.57	1.42	-0.79	1.69	0.51	0.04	2.17	-1.66
1967Q3	-0.09	184	0.31	0.94	-0.32	1.03	0.23	0.48	0.77	-0.55
1967Q4	-0.26	183	0.72	0.56	-1.44	0.82	1.18	0.04	1.97	-0.78
1968Q1	3.15	182	0.59	5.15	2.94	2.00	0.21	1.51	0.70	-0.49
1968Q2	-3.29	181	0.49	-0.39	-3.29	2.90	0.00	0.00	2.90	-2.90
1968Q3	2.71	180	0.24	2.71	1.69	0.00	1.02	0.71	0.31	0.71
1968Q4	3.11	179	0.49	3.11	0.31	0.00	2.80	2.67	0.13	2.67
1969Q1	-2.66	178	0.93	0.11	-3.38	2.77	0.72	0.36	3.13	-2.41
1969Q2	0.25	177	0.39	2.33	0.07	2.07	0.18	1.61	0.64	-0.46
1969Q3	1.32	176	0.33	1.62	0.48	0.30	0.84	1.03	0.11	0.73
1969Q4	2.08	175	0.26	2.08	0.11	0.00	1.97	1.56	0.41	1.56
1970Q1	-2.56	174	0.35	-0.38	-2.56	2.17	0.00	0.31	1.87	-1.87
1970Q2	2.03	173	0.31	3.13	1.52	1.09	0.51	0.74	0.86	-0.35
1970Q3	0.38	172	0.32	1.68	-0.02	1.30	0.40	0.68	1.02	-0.61
1970Q4	1.04	171	0.25	1.34	0.19	0.30	0.85	0.42	0.73	0.11
1971Q1	-4.48	170	0.51	-0.63	-4.48	3.85	0.00	0.00	3.85	-3.85
1971Q2	2.33	169	0.48	2.95	1.25	0.62	1.08	1.20	0.51	0.57
1971Q3	1.77	168	0.40	2.68	1.17	0.92	0.60	0.90	0.61	-0.01
1971Q4	0.96	167	0.25	1.32	-0.51	0.37	1.46	0.95	0.88	0.58
1972Q1	-3.30	166	0.65	0.25	-3.30	3.55	0.00	0.19	3.36	-3.36
1972Q2	2.57	165	0.59	2.85	0.31	0.28	2.27	0.19	2.35	-0.08
1972Q3	-0.41	164	0.42	0.37	-1.23	0.78	0.82	0.13	1.47	-0.65
1972Q4	3.64	163	0.48	3.64	1.58	0.00	2.06	2.06	0.00	2.06
1973Q1	5.86	162	0.70	7.71	4.46	1.84	1.40	2.69	0.56	0.84
1973Q2	-1.92	161	0.76	0.46	-2.42	2.38	0.50	0.32	2.57	-2.06
1973Q3	1.47	160	0.51	1.47	-1.01	0.00	2.49	2.49	0.00	2.49
1973Q4	-0.91	159	0.51	-0.12	-1.78	0.79	0.88	0.30	1.36	-0.48
1974Q1	-1.38	158	0.61	-0.84	-2.73	0.54	1.35	1.89	0.00	1.35
1974Q2	1.86	157	0.41	3.16	0.80	1.30	1.05	1.72	0.63	0.42
1974Q3	1.47	156	0.36	2.52	0.63	1.05	0.84	1.90	0.00	0.84
1974Q4	-0.17	155	0.40	0.12	-2.86	0.29	2.69	1.63	1.35	1.34
1975Q1	0.56	154	0.47	0.56	-1.71	0.00	2.28	0.50	1.78	0.50
1975Q2	-2.29	153	0.95	1.49	-2.84	3.78	0.55	3.20	1.12	-0.58
1975Q3	-0.30	152	0.62	0.04	-1.86	0.35	1.56	0.37	1.54	0.02

1975Q4	1.94	151	0.54	2.48	0.72	0.54	1.22	1.26	0.50	0.72
1976Q1	2.78	150	0.41	3.66	1.63	0.88	1.15	2.00	0.03	1.13
1976Q2	-3.23	149	0.40	0.19	-3.23	3.42	0.00	0.40	3.02	-3.02
1976Q3	1.76	148	0.25	2.45	0.69	0.69	1.07	1.16	0.59	0.48
1976Q4	2.17	147	0.41	2.27	-0.52	0.10	2.69	0.08	2.71	-0.02
1977Q1	-1.92	146	0.89	0.28	-2.35	2.20	0.43	0.22	2.41	-1.97
1977Q2	0.69	145	0.45	0.97	-0.62	0.28	1.31	1.59	0.00	1.31
1977Q3	-0.33	144	0.29	2.42	-0.33	2.75	0.00	1.73	1.02	-1.02
1977Q4	-0.48	143	0.48	2.46	-0.48	2.94	0.00	0.76	2.18	-2.18
1978Q1	1.14	142	0.28	2.03	-0.31	0.89	1.45	1.26	1.09	0.37
1978Q2	1.41	141	0.50	2.62	-0.02	1.21	1.42	1.38	1.26	0.17
1978Q3	1.08	140	0.66	1.31	-1.02	0.23	2.09	0.00	2.33	-0.23
1978Q4	-0.78	139	0.30	1.38	-0.78	2.16	0.00	0.40	1.76	-1.76
1979Q1	-1.66	138	0.50	-0.47	-2.54	1.19	0.87	0.02	2.04	-1.17
1979Q2	1.23	137	0.58	5.49	1.23	4.26	0.00	1.10	3.16	-3.16
1979Q3	-2.08	136	0.44	-1.08	-3.46	0.99	1.38	1.04	1.33	0.05
1979Q4	0.45	135	0.47	1.98	-0.61	1.52	1.07	0.94	1.66	-0.59
1980Q1	0.11	134	0.37	0.56	-1.47	0.46	1.57	1.66	0.36	1.21
1980Q2	-2.29	133	0.46	1.85	-3.43	4.14	1.14	3.80	1.47	-0.34
1980Q3	-1.04	132	0.56	1.13	-1.04	2.17	0.00	1.37	0.80	-0.80
1980Q4	0.32	131	0.42	0.32	-1.64	0.00	1.95	1.34	0.62	1.34
1981Q1	0.41	130	0.45	0.67	-1.39	0.26	1.80	0.94	1.12	0.68
1981Q2	-2.28	125	0.58	0.27	-2.28	2.55	0.00	0.00	2.55	-2.55
1981Q3	-0.66	125	0.77	1.44	-1.23	2.10	0.57	0.28	2.39	-1.82
1981Q4	1.75	125	0.58	1.98	-0.35	0.23	2.10	1.86	0.47	1.63
1982Q1	0.33	126	0.26	1.31	0.07	0.98	0.26	1.17	0.08	0.18
1982Q2	-0.65	125	0.61	1.28	-1.53	1.93	0.89	0.06	2.76	-1.87
1982Q3	0.33	124	0.24	1.07	-0.55	0.74	0.88	0.88	0.74	0.14
1982Q4	2.02	123	0.60	2.54	0.46	0.52	1.56	1.85	0.23	1.33
1983Q1	1.40	122	0.30	2.34	0.82	0.94	0.57	0.61	0.90	-0.33
1983Q2	-1.79	121	0.64	0.89	-1.79	2.68	0.00	0.00	2.68	-2.68
1983Q3	0.69	120	0.32	1.87	-0.33	1.18	1.02	0.70	1.50	-0.48
1983Q4	2.25	119	0.30	2.25	0.08	0.00	2.17	1.26	0.91	1.26
1984Q1	0.20	118	0.17	1.46	0.20	1.26	0.00	0.62	0.64	-0.64
1984Q2	-1.14	117	0.22	-0.32	-1.17	0.82	0.03	0.60	0.25	-0.22
1984Q3	-0.41	116	0.28	0.70	-0.45	1.11	0.04	0.33	0.82	-0.78
1984Q4	2.87	115	0.32	2.87	1.06	0.00	1.81	1.39	0.42	1.39
1985Q1	0.53	114	0.34	2.34	0.53	1.81	0.00	1.19	0.62	-0.62
1985Q2	0.99	113	0.34	1.63	0.11	0.65	0.88	0.00	1.53	-0.65
1985Q3	-0.15	112	0.13	0.71	-0.15	0.86	0.00	0.80	0.06	-0.06
1985Q4	1.12	111	0.27	1.12	-0.62	0.00	1.74	0.65	1.09	0.65
1986Q1	1.12	110	0.23	2.46	0.75	1.34	0.37	1.71	0.00	0.37
1986Q2	-0.02	109	0.33	1.59	-0.30	1.61	0.28	0.45	1.43	-1.15

1986Q3	0.16	108	0.46	1.41	-0.97	1.24	1.13	0.73	1.64	-0.51
1986Q4	1.36	107	0.35	2.93	0.91	1.57	0.45	1.04	0.97	-0.52
1987Q1	1.44	106	0.17	1.44	0.30	0.00	1.15	0.60	0.54	0.60
1987Q2	0.19	105	0.32	1.58	-0.84	1.39	1.04	0.19	2.23	-1.19
1987Q3	2.49	104	0.18	2.58	1.77	0.09	0.72	0.14	0.67	0.05
1987Q4	1.03	103	0.33	1.39	-0.83	0.36	1.86	0.22	2.01	-0.14
1988Q1	0.05	102	0.32	1.89	0.05	1.84	0.00	0.00	1.84	-1.84
1988Q2	0.25	101	0.16	1.39	0.25	1.14	0.00	0.74	0.41	-0.41
1988Q3	-2.28	100	0.56	1.55	-2.28	3.83	0.00	0.00	3.83	-3.83
1988Q4	2.18	99	0.20	2.18	0.62	0.00	1.56	1.32	0.24	1.32
1989Q1	-0.40	98	0.15	0.65	-0.40	1.05	0.00	0.24	0.81	-0.81
1989Q2	0.06	97	0.18	0.74	-0.15	0.68	0.22	0.11	0.79	-0.57
1989Q3	0.47	96	0.18	0.72	0.05	0.26	0.42	0.67	0.00	0.42
1989Q4	0.76	95	0.15	0.76	0.03	0.00	0.73	0.73	0.00	0.73
1990Q1	0.46	94	0.19	1.18	0.41	0.72	0.05	0.55	0.21	-0.16
1990Q2	0.99	93	0.10	0.99	0.46	0.00	0.53	0.51	0.02	0.51
1990Q3	-1.28	92	0.11	-0.99	-1.63	0.29	0.35	0.11	0.53	-0.18
1990Q4	-0.93	91	0.16	-0.39	-1.20	0.53	0.27	0.00	0.81	-0.53
1991Q1	-0.47	90	0.25	-0.03	-0.82	0.44	0.34	0.29	0.50	-0.16
1991Q2	-0.46	89	0.14	-0.15	-0.72	0.31	0.26	0.00	0.57	-0.31
1991Q3	0.08	88	0.17	0.26	-0.39	0.18	0.47	0.51	0.13	0.33
1991Q4	-0.12	87	0.08	0.24	-0.15	0.36	0.03	0.06	0.32	-0.30
1992Q1	-0.84	86	0.40	0.34	-0.93	1.18	0.09	0.30	0.97	-0.88
1992Q2	-0.15	85	0.15	0.18	-0.35	0.32	0.20	0.28	0.24	-0.04
1992Q3	0.06	84	0.11	0.83	0.06	0.76	0.00	0.16	0.61	-0.61
1992Q4	0.28	83	0.19	0.86	0.04	0.58	0.24	0.12	0.69	-0.45
1993Q1	0.46	82	0.14	0.98	0.31	0.51	0.15	0.21	0.45	-0.30
1993Q2	0.49	81	0.11	0.76	0.20	0.27	0.29	0.23	0.33	-0.04
1993Q3	0.65	80	0.09	1.06	0.65	0.41	0.01	0.23	0.19	-0.18
1993Q4	0.58	79	0.18	1.18	0.58	0.60	0.00	0.45	0.14	-0.14
1994Q1	0.76	78	0.15	1.49	0.76	0.73	0.00	0.22	0.51	-0.51
1994Q2	1.17	77	0.09	1.51	1.17	0.34	0.00	0.33	0.02	-0.02
1994Q3	0.73	76	0.21	1.43	0.73	0.70	0.00	0.28	0.43	-0.43
1994Q4	0.70	75	0.07	0.86	0.53	0.16	0.17	0.33	0.00	0.17
1995Q1	0.65	74	0.10	0.65	0.28	0.00	0.37	0.37	0.00	0.37
1995Q2	0.56	73	0.16	0.84	0.37	0.28	0.20	0.45	0.02	0.17
1995Q3	0.40	72	0.32	1.16	0.32	0.75	0.09	0.07	0.77	-0.68
1995Q4	0.52	71	0.14	0.82	0.35	0.30	0.17	0.34	0.13	0.04
1996Q1	0.37	70	0.17	1.18	0.37	0.81	0.00	0.00	0.81	-0.81
1996Q2	0.54	69	0.12	0.65	0.05	0.11	0.49	0.37	0.23	0.26
1996Q3	0.45	68	0.13	0.89	0.35	0.44	0.10	0.54	0.00	0.10
1996Q4	1.14	67	0.21	1.33	0.32	0.19	0.82	1.01	0.00	0.82
1997Q1	0.95	66	0.25	1.27	0.48	0.32	0.47	0.79	0.00	0.47

1997Q2	1.00	65	0.13	1.21	0.66	0.20	0.34	0.06	0.48	-0.14
1997Q3	0.93	64	0.18	1.03	0.40	0.10	0.52	0.31	0.32	0.21
1997Q4	0.32	63	0.27	1.34	0.32	1.02	0.00	0.00	1.02	-1.02
1998Q1	0.76	62	0.14	0.94	0.42	0.18	0.34	0.31	0.22	0.12
1998Q2	0.47	62	0.12	0.82	0.30	0.35	0.17	0.06	0.45	-0.29
1998Q3	0.41	61	0.24	1.11	0.28	0.70	0.13	0.39	0.44	-0.31
1998Q4	0.06	60	0.35	1.19	0.02	1.12	0.05	0.17	1.00	-0.95
1999Q1	0.04	59	0.14	0.57	0.04	0.53	0.00	0.10	0.43	-0.43
1999Q2	0.64	58	0.18	0.80	0.02	0.16	0.62	0.56	0.22	0.40
1999Q3	0.77	57	0.22	1.88	0.77	1.11	0.00	0.25	0.86	-0.86
1999Q4	0.77	56	0.19	1.35	0.69	0.58	0.08	0.01	0.65	-0.57
2000Q1	0.50	55	0.33	1.42	0.38	0.92	0.12	0.37	0.67	-0.55
2000Q2	0.94	54	0.21	1.41	0.59	0.47	0.34	0.68	0.13	0.21
2000Q3	0.70	53	0.15	0.87	0.30	0.17	0.40	0.50	0.08	0.32
2000Q4	0.41	52	0.13	0.69	0.23	0.29	0.18	0.40	0.06	0.11
2001Q1	0.46	51	0.24	1.35	0.46	0.90	0.00	0.22	0.67	-0.67
2001Q2	0.45	50	0.19	0.77	0.12	0.32	0.33	0.00	0.65	-0.32
2001Q3	0.46	49	0.10	0.67	0.31	0.21	0.14	0.13	0.22	-0.08
2001Q4	0.00	48	0.10	0.54	0.00	0.54	0.00	0.23	0.31	-0.31
2002Q1	0.15	47	0.21	0.83	0.12	0.69	0.02	0.38	0.33	-0.31
2002Q2	0.63	46	0.15	0.83	0.34	0.20	0.29	0.01	0.48	-0.19
2002Q3	0.94	45	0.10	1.07	0.64	0.13	0.30	0.19	0.24	0.06
2002Q4	0.38	44	0.19	1.05	0.34	0.67	0.04	0.14	0.57	-0.53
2003Q1	0.09	43	0.18	0.96	0.09	0.88	0.00	0.00	0.88	-0.88
2003Q2	0.61	42	0.29	1.41	0.37	0.80	0.23	0.00	1.03	-0.80
2003Q3	0.81	41	0.19	1.28	0.73	0.47	0.09	0.02	0.54	-0.45
2003Q4	0.91	40	0.11	1.31	0.91	0.39	0.00	0.31	0.08	-0.08
2004Q1	0.73	39	0.18	1.03	0.32	0.31	0.41	0.71	0.00	0.41
2004Q2	0.90	38	0.26	0.96	0.24	0.06	0.66	0.66	0.06	0.60
2004Q3	0.46	37	0.15	0.55	0.00	0.10	0.45	0.42	0.13	0.33
2004Q4	0.68	36	0.12	0.81	0.41	0.13	0.28	0.40	0.00	0.28
2005Q1	0.37	35	0.16	0.75	0.20	0.38	0.18	0.05	0.51	-0.33
2005Q2	0.49	34	0.27	1.30	0.45	0.81	0.04	0.28	0.58	-0.53
2005Q3	0.41	33	0.18	1.03	0.40	0.62	0.01	0.00	0.63	-0.62
2005Q4	0.56	32	0.24	1.35	0.49	0.79	0.07	0.00	0.86	-0.79
2006Q1	0.73	31	0.24	1.14	0.38	0.41	0.35	0.55	0.20	0.15
2006Q2	0.69	30	0.20	0.81	0.28	0.12	0.41	0.31	0.22	0.19
2006Q3	0.68	29	0.18	0.70	0.18	0.02	0.51	0.53	0.00	0.51
2006Q4	0.67	28	0.08	0.95	0.67	0.28	0.00	0.20	0.08	-0.08
2007Q1	0.68	27	0.16	1.13	0.68	0.45	0.00	0.37	0.08	-0.08
2007Q2	0.82	26	0.27	1.29	0.56	0.47	0.26	0.69	0.04	0.22
2007Q3	0.66	25	0.30	1.24	0.50	0.57	0.17	0.39	0.35	-0.18
2007Q4	0.62	24	0.20	0.89	0.11	0.27	0.51	0.42	0.36	0.15

2008Q1	0.27	23	0.24	0.79	0.02	0.52	0.25	0.48	0.29	-0.04
2008Q2	0.00	22	0.46	0.00	-1.27	0.00	1.27	0.24	1.03	0.23
2008Q3	-0.65	21	0.50	-0.65	-1.96	0.00	1.31	1.02	0.30	1.02
2008Q4	-1.55	20	0.19	-1.55	-2.25	0.00	0.70	0.68	0.03	0.68
2009Q1	-2.40	19	0.43	-1.50	-2.61	0.90	0.21	0.29	0.82	-0.61
2009Q2	-0.59	18	0.27	-0.17	-0.82	0.41	0.23	0.09	0.56	-0.33
2009Q3	-0.16	17	0.29	0.40	-0.29	0.56	0.13	0.20	0.49	-0.36
2009Q4	0.44	16	0.13	0.74	0.35	0.30	0.08	0.35	0.04	0.05
2010Q1	0.33	15	0.14	0.59	0.16	0.26	0.17	0.08	0.35	-0.18
2010Q2	1.17	14	0.18	1.17	0.71	0.00	0.45	0.19	0.26	0.19
2010Q3	0.71	13	0.08	0.72	0.40	0.01	0.31	0.07	0.24	0.07
2010Q4	-0.47	12	0.20	0.02	-0.51	0.49	0.04	0.00	0.54	-0.49
2011Q1	0.47	11	0.08	0.54	0.25	0.07	0.22	0.00	0.29	-0.07
2011Q2	0.10	10	0.11	0.23	-0.09	0.13	0.19	0.00	0.32	-0.13
2011Q3	0.57	9	0.06	0.70	0.52	0.13	0.05	0.00	0.18	-0.13
2011Q4	-0.30	8	0.15	-0.01	-0.36	0.28	0.06	0.00	0.34	-0.28
2012Q1	-0.32	7	0.17	0.07	-0.32	0.39	0.00	0.00	0.39	-0.39
2012Q2	-0.38	6	0.13	-0.18	-0.50	0.20	0.13	0.00	0.32	-0.20
2012Q3	0.94	5	0.08	0.94	0.74	0.00	0.20	0.11	0.09	0.11
2012Q4	-0.29	4	0.05	-0.23	-0.34	0.06	0.04	0.11	0.00	0.04
2013Q1	0.27	3	0.17	0.60	0.27	0.33	0.00	0.00	0.33	-0.33
2013Q2	0.66	2	0.01	0.66	0.64	0.00	0.01	0.01	0.00	0.01
2013Q3	0.85	2	0.10	0.85	0.72	0.00	0.14	0.14	0.00	0.14
2013Q4	0.62	2	0.15	0.62	0.41	0.00	0.21	0.21	0.00	0.21
2014Q1	0.74	2	0.09	0.74	0.61	0.00	0.13	0.13	0.00	0.13
2014Q2	0.91	2	0.07	0.91	0.81	0.00	0.10	0.10	0.00	0.10
2014Q3	0.74	1	0.00	0.74	0.74	0.00	0.00	0.00	0.00	0.00

Table A1: Real-time growth rates of real GDP at market prices and some comparison statistics with their subsequent revisions.