

GDP Quarterly Estimates: Technical Note

1 Revision of the Quarterly National Accounts (QNA) in summer 2012

The National Accounts (NA) for Switzerland were revised in summer 2012. The revision of the annual data was carried out by the Swiss Federal Statistical Office (SFSO) and focused primarily on the integration of the new statistical classification of economic activities NOGA 2008¹, the adoption of updated data from revised statistics, as well as the adaptation of a number of methods used for calculations.

The revision of the NA led to a retropolation of annual data for the period 1990-2010. The QNA were adjusted accordingly this summer.² In particular, gross domestic product (GDP) by industry data, which provide detailed information (value added estimates) about specific industries, was adjusted on the basis of the new NOGA classification. For some aggregates on the expenditure side of GDP new quarterly indicators were introduced during the summer 2012. In addition, a new reference year (2005) was adopted for the calculation of volume data that are published as chain-linked series.³ The results of the revised QNA for the quarters from 1990, together with the initial results of the second quarter 2012, were published on September 4, 2012. This occasion was also used to review all previous quarterly calculations and revise these if necessary (including the method of seasonal adjustment). Before going into further detail on the adjustments of the QNA in this Technical Note, the section below deals with a number of fundamental concepts that are used for the compilation of the QNA in Switzerland, which continue to apply after this last revision.

2 Basic Principles in the Production of the Quarterly VGR

For some years now - in addition to the annual data of the National Accounts - the Swiss QNA has been providing time series (seasonally and non-seasonally adjusted figures) for income, expenditure and production measures of gross domestic product (GDP) at current and constant prices.

Because of the continuing relatively difficult data situation and various methodological and conceptual questions in documenting changes in inventories in many sectors of the Swiss economy, the quarterly GDP is primarily calculated as the sum of the value added by specific sectors (total value added generated by various production units, plus taxes on goods, less subsidies). Changes in inventories are then calculated as the difference between the GDP estimated according to the production approach and the total of the components on the expenditure side. In a further step, a plausibility check is conducted on the basis of the available

¹ The NOGA (the abbreviation comes from the French "Nomenclature Générale des Activités économiques") is a 5-tiered classification system of economic activities. The NOGA 2008 is modelled after the latest version of the Statistical classification of economic activities in the European Community (NACE Rev. 2) (see for instance: http://www.bfs.admin.ch/bfs/portal/en/index/infothek/nomenklaturen/blank/blank/noga0/questions_frequentes.0001.html).

² An initial, provisional adjustment of the quarterly data was carried out in June (see Media Release by the SECO "Information Note dated June 29, 2012, Revision of the GDP Quarterly Estimates"). A more detailed memorandum from the Swiss Federal Statistics Office on the content of this revision of the VGR is available at: http://www.bfs.admin.ch/bfs/portal/de/index/themen/04/01/new/nip_detail.Document.160923.pdf ("Production Account for Switzerland 2010, Revised Data for the Analysis of Switzerland's Macro-Economic Situation").

³ The chain-linking is performed with the annual overlap method in which volume estimates at the average prices of the previous year are used. The advantage of this method (annual overlap) is that the equality between the sum of the four quarters and the year is ensured so that no additional adjustment is necessary. The chaining of quarterly data leads however to a non-additivity problem of the series expressed in volume terms. An aggregate is not equal to the sum of its components. Volume estimates must be un-chained independently before they add up; the aggregate they formed is chained again after the summation of the un-chained components. Unlike the choice of base year, the choice of reference year has no effect on the growth rates, only the level of the volume series is affected by the choice of the reference year.

indicators and various information on inventories developments (and if required, new calculations are performed).

The decision regarding the aggregation level on which the quarterly estimates of the various GDP components are to be carried out, forms an important basis for estimating the QNA and for the quality of the documentation of short-term economic fluctuations. This decision is dependent upon the categorization and availability of the annual NA data, the number and quality of the short-term indicators in Switzerland, as well as the EU regulations on the publication of the QNA results. The yearly NA for calculating the GDP on the production side is based on a categorization of the value added according to approx. 50 sectors. Information on the gross output and intermediate consumption for the Swiss economy is published annually for each sector.⁴ This highest potential level of disaggregation for the QNA is set against the disaggregation level of 11 components for the QNA stipulated as a minimum requirement by the EU. For the purpose of estimating quarterly GDP, the value added of 17 industries is estimated on a quarterly basis, for which annual figures have been available since 1990.

Within the Swiss QNA a distinction can be drawn between two different starting points. If the data used for calculating the yearly NA is also available on the quarterly level, the estimation procedure and methods used for calculating the annual data, often in simplified form, are applied for calculating the corresponding quarterly figures. When the annual data source used for the compilation of the yearly NA is not available on a quarterly basis, a different method and estimation procedure have to be applied. Very often QNA data is estimated with the help of econometric procedures⁵ in which annual NA figures are broken down into quarterly aggregates with the help of linear regressions applying quarterly indicators. The methods used ensure that the quarterly figures respectively add up to the annual figure, as long as the yearly data is known.⁶ The linear regression specifications and the indicators which explain most of the variability of the corresponding yearly NA components in levels as well as in growth rates are selected for the interpolation and extrapolation of the annual data.⁷ Finally, for the definitive choice between concurrent indicators, an assessment is made on the basis of economic theory and of national accounts definitions.

3 Main Aspects of the 2012 Revision

3.1 Production account

The estimate of the production account is affected by numerous, far-reaching changes caused by the changeover to the new NOGA 2008.

Since the PAUL statistics (industrial production) of the SFSO have been replaced by the INDPAU⁸ and since there are still insufficient data points available for the latter series of data to enable linear regressions to be estimated, the value added in industry will now be estimated with the help of export figures and price indices. Construction indices of the Swiss Association of Master Builders (SBV Schweizerischer Baumeisterverband) will now be included in the estimation of the value added for the construction sector.

There are also significant changes in the trade sector where recalculations of the annual data have led to a marked upward revision of the level of value added. Now, better than in the past, a clearer link can be established on an annual level between the net exports of merchanting trade (energy and other raw materials

⁴ A production account categorized according to 17 sectors will be updated each year for the previous year (t-1). In the following year (t-2), a more detailed categorization involving 50 sectors will be made available (e.g. in 2012 for the year 2010).

⁵ The following book discusses and compares both methods in detail: Dagum, E. B. and P. A. Cholette, 2006, *Benchmarking, Temporal Distribution, and Reconciliation Methods for Time Series*, Lecture Notes in Statistics 186, Springer.

⁶ In the implementation of these assessment methods the SECO relies on the R Packet "tempdisagg" written by Christoph Sax and Peter Steiner (<http://cran.r-project.org/web/packages/tempdisagg/index.html>).

⁷ The breakdown of the annual figures into quarterly aggregates is known as interpolation. Extrapolation is used for the current timeframe for which no annual data is yet available.

⁸ See Press Release of the SFSO dated July 16, 2012: Production, Order and Sales Statistics of Industry in the 1st Quarter 2012, http://www.bfs.admin.ch/bfs/portal/de/index/themen/06/01/new/nip_detail.html?gnplD=2012-555.

trade-related services) and the value added for trade. This link will be taken into account by including merchanting trade data (from the Swiss current account) in the estimation of the value added of trade that is part of the QNA based on the production approach. However, as a result of the still relatively low importance of the merchanting trade in percent of the overall trade, the effect of these changes on the volatility of the value added will be small. KOF surveys⁹ and other figures for retail sales calculated by the SFSO are additional new indicators for the value added of trade.

The value added generated by banking will now be estimated exclusively with the help of current account data (exports of bank commissions) and quarterly FISIM¹⁰ estimates. The value added created by insurance companies will now be determined through the level of employment as will the value added of many corporate services. The value added in the healthcare sector will be estimated with the help of the cost monitoring carried out by the Swiss Federal Office of Public Health. The value added in the areas of art, entertainment etc. and domestic production will also be estimated on the basis of data on employment levels.

3.2 Investments and exports

Since the changeover to the ESVG78¹¹ in 1997 the quarterly development of investments in equipment has been based on the so-called commodity flow method. Investments in equipment equated to the balance arising from the production (domestic production and imports) and use (exports and other consumption) of investment goods. This method was retained and has now been applied since 1990.

The Revision in 2012 led to significant changes in the structure of investments in equipment. In many aspects there is not always a clear distinction between consumption and investment. The definition of investment goods is internationally regulated. Many so-called investment goods, such as for example vehicles, count as consumption if these are purchased by private households but as investment in the case of companies. The use of the so-called investment quotas for many goods is consequently necessary. These define which portion is to be included as investments and which as consumption. In addition, the way in which investments are recorded will be adapted to the new economic structures as a result of the changeover to the NOGA 2008. In the past this primarily took account of investments in industry. Investments in metal and machine construction alone accounted for around 45% of the total investments. This share is now just over 25%. The changeover gave additional weight to information technology. As such, information technology services utilized are now counted towards investments and account for nearly 20% of the total investments.

New price indices were introduced for the deflation of trade in goods (new export prices and many import prices which are calculated by the Swiss Federal Statistics Office have been introduced). New concepts for the deflation of the merchanting trade, developed by the SFSO, as well as new data, were introduced and applied. Furthermore, the non-regulated flow of goods (essentially illegally imported drugs) is also now taken into account on the quarterly level as part of goods imports.

3.3 Seasonal adjustment

The question regarding the choice of aggregation level arises when it comes to applying the seasonal adjustment to the quarterly aggregates which are calculated as a total of the sub-aggregates (e.g. categories in the production account or functions of private consumption, investments or export and import positions). The literature often draws a distinction between “direct” and “indirect” seasonal adjustment.¹² An aggregate can either be “directly” seasonally adjusted or its independently seasonally adjusted components can be added up to determine the seasonal adjusted series (of this aggregate). This so-called “indirect” adjustment enables the specific seasonal changes in the individual components of an aggregate to be better taken into account. In many cases, international experience shows that the results of direct and indirect adjustment produce relative similar outcomes, although there is often less need for revision with indirect seasonal adjustment. This is relevant in

⁹ KOF, ETH, Zürich: <http://www.kof.ethz.ch/en/indicators/>.

¹⁰ FISIM stands for Financial Intermediation Services Indirectly Measured.

¹¹ Info Sheet for Economic Questions, Double No. 4/97-1/98, BWA, Berne, *The quarterly estimates of the gross domestic product based on the revised production account (ESVG78)*.

¹² e.g. Astolfi, Ladiray and Mazzi, 2003, *Seasonal Adjustment of European Aggregates: Direct versus Indirect Approach* <http://www.uni-mannheim.de/edz/pdf/eurostat/01/KS-AN-01-014-EN-I-EN.pdf>.

particular if the functions or categories of an aggregate show very different seasonal patterns and irregularities. This summer, the decision was made to switch to indirect seasonal adjustment for the seasonal adjustment of investments in equipment and for exports and imports of goods. Direct seasonal adjustment continues to be applied for the flow of services (exports and imports).

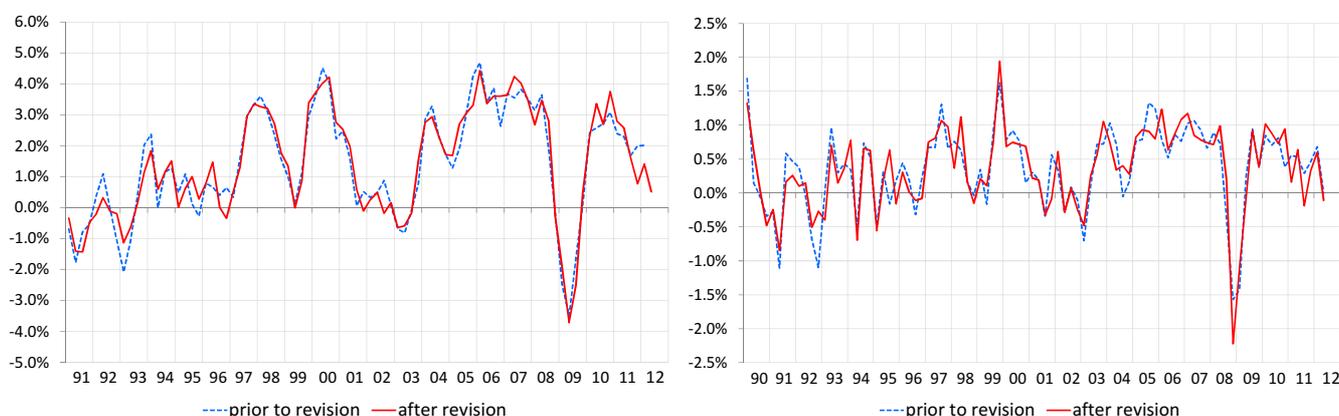
3.4 Consequences for the quarterly development of GDP

As a result of the revision of the NA, there is a greater consistency with trade on the production and expenditure side of GDP on a quarterly and on a yearly level. This will lead to trade being accorded a more important role for GDP fluctuations and this will be reflected in an increased contribution to GDP growth from trade. In this context the increased dynamic and volatility of the annual figures following the revision is carried over to the GDP quarterly figures. Consequently, the quarterly series of the GDP based on the production approach after the 2012 revision is slightly more volatile than prior to the implementation of the revision (Diagram 1).

The correlation coefficient of the new GDP quarterly series (growth rate compared with previous quarter) compared with that prior to the revision is 0.88 based on the period 1990 to 2011. On one hand, these differences result from the integration of new yearly data (and new weightings structure) and on the other hand from the integration of new or revised quarterly indicators.

Diagram 1: Comparison of the gross domestic product prior to and after the revision in Summer 2012

at prices for the previous year, chained series, left: rates of change in percent compared with the same quarter in the previous year, right: rates of change in percent compared with the previous quarter.



4 Outlook

The revision of the NA 2012, including the adaptation to NOGA 2008, took place within the framework of the ESA95 (European System of National Accounts, edition 1995). It is planned to implement the new ESA 2010 for the year 2014. This adaptation will also result in a revision of the NA accounts figures, on yearly and on quarterly basis.

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