

**LITHUANIAN
QUARTERLY NATIONAL ACCOUNTS
INVENTORY**

DECEMBER 2017, VILNIUS

LITHUANIAN QNA INVENTORY

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LIST OF ABBREVIATIONS

| | |
|--------|--|
| BoL | Bank of Lithuania |
| BoP | Balance of payments |
| CFC | Consumption of fixed capital |
| CFC | Consumption of fixed capital |
| CIF | Cost insurance freight |
| COFOG | Classification of the Functions of Government |
| COICOP | Classification of Individual Consumption According to Purpose |
| CPI | Consumer price index |
| EAA | Economic Accounts for Agriculture |
| EDP | Excessive deficit procedure |
| EU | The European Union |
| FCE | Final consumption expenditure |
| FISIM | Financial Intermediation Services Indirectly Measured |
| FOB | Free on board |
| GDP | Gross Domestic Product |
| GFCF | Gross fixed capital formation |
| GFCF | Gross fixed capital formation |
| GFS | Government Finance statistics |
| GNI | Gross National income |
| GVA | Gross value added |
| HBS | Household Budget Survey |
| HFCE | Household final consumption expenditure |
| IOT | Input–Output Tables |
| LFS | Labour Force Survey |
| LNA | Lithuanian National Accounts |
| MoF | Ministry of Finance of the Republic of Lithuania |
| MQD | Methodology and Quality |
| NA | National accounts |
| NACE | General industrial classification of economic activities within the European Union |
| NAD | National Accounts division |
| NPISHs | Non-profit institutions serving households |
| QNA | Quarterly National Accounts |
| QSA | Quarterly institutional sector accounts |
| RoW | Rest of the world |
| SBS | Structural Business Statistics |
| SDDS | Special Data Dissemination Standard |
| SL | Statistics Lithuania |
| STI | State Tax Inspectorate Under the MoF of the Republic of Lithuania |
| SUT | Supply and use tables |
| VAT | Value-added tax |
| W&S | Wages and salaries |

Introduction

The purpose of this document is to provide a description of data sources and methods used to compile the quarterly GDP and its components in the Republic of Lithuania. The GDP compilation practice is currently based on ESA 2010 international Standard.

Structure and content of this document is based on the Eurostat recommendations. The document is focused on the quarterly GDP and of its components compilation. To better illustrate the process of quarterly national accounts compilation and the estimation methods used, the description is complemented by numerical illustrations of quarterly GDP of 2014.

This description is the result of a Eurostat grant (Progress towards full implementation of the ESA 2010 and its transmission programme for quarterly and annual National Accounts and lifting of respective derogations, full implementation of SDMX for National Accounts, development and implementation of quality framework for National Accounts data. Grant Agreement No 04121.2016.003-2016.354.)

This document will be updated in the future if there are significant changes in methodology or estimation procedures.

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Chapter 1. Overview of the system of quarterly accounts

1.1. Organisation and institutional arrangements

1.1.1. The Lithuanian Department of Statistics (SL) is responsible for the compilation of national accounts.

1.1.2. SL is a government authority coordinating official statistics in the country that participates in developing and implementing public policy in the field of organisation and methodology of statistics assigned to the Minister of Finance. Employing statistical methodological principles, SL compiles, processes, analyses and publishes official statistics on economic, social, demographic and environmental changes in the country.

1.1.3. SL coordinates the activity of ministries and other institutions in the field of official statistics, produces regional and administrative-territorial statistical indicators. Statistical information is accessible to all users interested in the socio-economic development of Lithuania and is available on the website of SL.

1.1.4. NA in general and some related statistics are produced by three divisions of SL: the National Accounts division, the Government Finance statistics division and the division of Methodology and Quality. They all are responsible for implementation of the requirements of the main legal act, i.e. the Regulation (EU) No 549/2013 of the European Parliament and of the Council of 21 May 2013 on the European system of national and regional accounts in the European Union (ESA 2010) as regards adaptation of methodological rules and dissemination to the users (including European Commission) of the produced national accounts aggregates.

1.1.5. The LNA are estimated both quarterly and annually. GDP is obtained from the production, income and expenditure sides every quarter from 1995. GDP by production and expenditure approaches are estimated at current prices and in volume terms while the GDP by income approach is estimated only at current prices. The quarterly GDP data are seasonally adjusted.

1.1.6. The NAD is responsible for the compilation and publication of the complete and comprehensive LNA. The division has 23 employees of which 13 persons are engaged in the compilation of quarterly aggregates.

1.1.7. The NAD compiles: a) annual and quarterly main aggregates of NA, main aggregates by industry, employment, institutional sector (annual and quarterly) and regional accounts, SUT and IOT, capital stock, according to the requirements of DTP of ESA 2010, and in addition: b) VAT and GNI own resources; c) GDP expenditure components, weights for PPP.

1.1.8. The GFS division is responsible for organization and compilation of statistics as concerns transactions of the general government sector (non-financial and financial, annual and quarterly), annual financial accounts and balance sheets for all institutional sectors. It is also in charge of the EDP statistics and statistics on Pensions' schemes.

1.1.9. The MQD is not directly involved in the estimates of a particular domain of NA; however the specialists produce the first estimate of GDP at t+30 (flash) days on the basis of econometric models as well as the second GDP estimate by production approach. They also produce seasonally adjusted data in all cases where necessary.

1.2. Publication timetable, revisions policy and dissemination of QNA

1.2.1. SL publishes quarterly GDP two times after the end of reference quarter. First release of provisional GDP (flash estimate) is issued on 30th day after the end of quarter. Only nominal, real and seasonally adjusted GDP and its growth rate are published at this time and also transmitted to Eurostat.

1.2.2. Second GDP estimate is published at t+2 months after the end of reference quarter. This publication covers GDP estimates by three approaches: production, income and expenditure. Gross value added is presented by 10 kind of activity. Components of GDP estimated by income and expenditure approaches are published as well.

1.2.3. The third estimate of quarterly GDP is produced at t+4 months and published along with the flash estimate of the next quarter. More detailed data are estimated on the basis of information from the statistical surveys. Gross value added is published by 10 kind of activity.

1.2.4. Quarterly data on Employment are produced and published twice. Publication is available at approximately 45 days after the end of reference quarter. Second more detailed estimate is made in t+2 months after the end of reference quarter.

1.2.5 Quarterly GDP data are reconciled with revised t-1 annual GDP data at 9th month after the end of reference year when the preliminary SBS data are available. At the same time the quarterly data for the year t-2 are revised and reconciled due to revision of annual GDP for this year having the final SBS data. Quarterly data for the year t-3 are revised when the balancing procedure of SUT is performed and the GDP level for that year is determined. The revised quarterly time series are released along with the annual data at the end of September.

1.3. QNA compilation approach

1.3.1. Quarterly GDP is estimated by production, income and expenditure approaches. GDP calculations by production and expenditure approaches are considered to be the main approaches in LNA and are produced independently. The income approach is not an independent approach, since operating surplus and mixed income are derived as the residual item. The breakdowns of value added and GDP income components are available by kind of economic activity. The GDP expenditure components are split according to their specific classifications.

1.3.2. For the compilation of QNA the monthly and quarterly statistical surveys and administrative data sources are used. Short-term statistics provides the volume indices. Most important survey for the production and income approaches is the quarterly statistical survey on businesses that is organised in an analogous to the annual SBS way.

1.3.3. Different compilation methods are applied at each stage of GDP calculation. Firstly, flash and the second GDP estimates are made using the econometric models. GDP components are estimated using multiple regression, autoregressive (AR) and ARIMAX models.

1.3.4. For the third quarterly GDP estimates the actual quarterly statistical or administrative data sources are used. Detailed data from business surveys by kind of activity are available. The public finance statistics, balance of payments, data on wages and salaries also are available.

1.3.5. The flash employment is calculated for total employed persons and working hours at A*10 level of NACE rev. 2. Data of employees and self employed are estimated using different time

series models. Quarterly data on total employment, economically active and unemployed persons in national concept is available from LFS.

1.4. Balancing, benchmarking and other reconciliation procedures

1.4.1. In Lithuania GDP estimated by three approaches is always balanced, no statistical discrepancy is published.

1.4.2. Benchmarking technique is used for the quarterly and annual data reconciliation and for estimates of some specific GDP components.

1.4.3. In cases when direct data sources for the revision of back data series are not available back-casting technique is applied.

1.5. Volume estimates

1.5.1. Quarterly GDP at current prices is estimated by production, expenditure and income methods whereas volumes of quarterly GDP are estimated by production and expenditure approaches.

1.5.2. Chain-linking technique is applied for GDP volume estimates. The chain-linking is performed using annual overlap method – volume estimates at the average prices of the previous year are used.

1.5.3. The estimation of GDP and its elements at previous year prices by production approach is performed extrapolating value added of activities in previous year by the volume index of output. PPI's, CPI's, CIPI's, SPPI's, some quantity data and price deflators estimated in expert way are used.

1.5.4. CIPI's, EPI's, IPI's, SPPI's and CPI's are used for the estimation of GDP components at previous year prices by expenditure approach.

1.6. Seasonal and calendar adjustment

1.6.1. GDP estimated by three approaches and the components as well as employment data are published seasonally and calendar adjusted and unadjusted.

1.6.2. At t+30 days only total GDP by production approach at current prices and in volume terms is seasonally and calendar adjusted.

1.6.3. At t+2 months GDP components estimated by three approaches are seasonally and calendar adjusted. For production approach GVA by A*10 (NACE Rev. 2) at current prices and in volume terms is published calendar adjusted as well as seasonally and calendar adjusted.

1.6.4. All GDP components by expenditure approach at t+2 months are published seasonally and calendar adjusted at current prices and in volume terms.

1.6.5. For GDP estimated by income approach compensation of employees (D.1) and its components wages and salaries D. 1 (D.11) and employer's social contributions (D.12) by A*10 (NACE Rev. 2) are published seasonally and calendar adjusted.

1.6.6. At t+2 months employment data including the total number of employed persons, self employed and employees as well as hours worked by A*10 (NACE Rev. 2) is seasonally and calendar adjusted.

1.6.7. Method TRAMO/SEATS of the program DEMETRA+ is used for the seasonal and calendar adjustment at current prices and chain-linked volume for GDP components (by production and expenditure approaches) and at current prices for GDP components (by income approach). Indirect method is used for the seasonal and calendar adjustment at current prices and direct method is used for the seasonal and calendar adjustment at chain-linked volume.

1.7. Additional information

1.7.1. Quarterly GDP by activity breakdown and all components of production, expenditure and income approaches and employment data are published in Indicators Database <https://osp.stat.gov.lt/statistiniu-rodikliu-analize#/>

1.7.2. Press releases are available on Official Statistics Portal <https://osp.stat.gov.lt/>

Chapter 2. Publication timetable, revisions policy and dissemination of QNA

2.1. Release policy

2.1.1. QNA are compiled, published and transmitted to Eurostat according to the deadlines established in ESA 2010. Advanced release calendars are public and available on Official Statistics Portal (<https://osp.stat.gov.lt/informacijos-skelbimo-kalendoriai>).

2.1.2. Dissemination of QNA data is organised so that all users have the equal possibility to get information at the same time and with the same content. The publication time is at 11 a.m., and only the very limited number of users (the Government) has an access to the data to be published half an hour before.

2.1.3. Flash GDP estimates of quarter t are made and released approximately at 30th day after the end of quarter. Along with the flash estimates the results of the third estimate (t+4 months) of t-1 quarter are published. Second GDP estimate is published at t+2 months after the reference quarter.

2.1.4. Quarterly data on Employment are produced and published twice; flash estimate at approximately 45 days after the end of reference quarter, and second more detailed estimate at 2 months after the end of reference quarter.

2.1.5. Lithuanian QSA are published according ESA 2010 requirements at t+85 days after the end of reference quarter t. QSA are not fully aligned with QNA data at t+4 months because revised QNA estimates incorporate new GFS and BoP data. Inconsistencies are removed with the next release of QSA.

2.1.6. Quarterly GDP data are reconciled with revised t-1 annual GDP data at 9th month after the end of reference year when the preliminary SBS data are available. At the same time the quarterly data for the year t-2 are revised and reconciled due to revision of annual GDP for this year having the final SBS data. Quarterly data for the year t-3 are revised when the balancing procedure of SUT is performed. The revised quarterly time series are released along with the annual data at the end of September.

2.1.7. Information on release dates of the quarterly and annual aggregates is provided in release calendars on the Official Statistics Portal (<https://osp.stat.gov.lt/informacijos-skelbimo-kalendoriai>).

2.2. Contents published

2.2.1. Second GDP estimation is published in approximately t+2 months after the end of the reference quarter. Data present GDP components by production approach broken down by A*10 breakdown NACE Rev.2, also GDP components by income (Compensation of employees and its components by A*10 breakdown NACE Rev.2) and expenditure components split according to their specific classifications. Information published locally in Press release and database.

2.2.2. The transmission to Eurostat according to ESA 2010 data transmission program contains data in current, previous year prices, chain-linked volume also seasonal and calendar adjusted.

It contains:

- GDP components by three approaches at current prices in EUR million, A*10 breakdown NACE Rev.2 is used for GVA and compensation of employees D.1 and its components W&S D.11 and employer's social contributions D.12;
- Components of GDP by production and expenditure approaches at previous year prices in EUR million;
- Components of GDP by production and expenditure approaches chain linked volumes in EUR million;
- HFCE by durability at current, previous year prices and chain-linked volume in EUR million;
- Exports and Imports of goods and services (geographical breakdown- EU, non EU, EA, European institutions) at current, previous prices and chain-linked volumes;
- Employment data on total employed persons, self employed and employees as well as hours worked for each category by A*10 breakdown NACE Rev.2;

All variables listed above are transmitted both seasonally and calendar adjusted and unadjusted. Additionally GDP components by production approach are transmitted with calendar adjustment.

2.2.3. QSA data are published approximately at 85 days after the end of reference quarter and presented in database, also transmitted to Eurostat (data table 0801 according to the ESA 2010 Data Transmission Programme). As the Lithuanian GDP represents less than 1% of the EU total the QSA produced covers data for Total Economy (S.1), sectors of General Government (S.13) and the Rest of the World.

2.2.4. Revised GDP components by production approach (A*10 breakdown NACE Rev. 2), income and expenditure approach are published and transmitted to Eurostat approximately at t+4 months after the reference quarter at the same breakdown as at t+2 months.

2.3. Policy for metadata

2.3.1. The Government Resolution No 537 (June 1997) on the Application of the IMF Special Data Dissemination Standard in Lithuania (Gazette, 1997, No. 50-1197) defines the responsibilities for the compilation and dissemination of data in compliance with the SDDS requirements. The metadata for QNA is produced according to the SDDS standard and is available on the IMF website

(<http://dsbb.imf.org/Pages/SDDS/DQAFBase.aspx?ctycode=LTU&catcode=NAG00>) after the yearly update.

2.3.2. SL publishes and regularly updates NA quarterly and annual metadata on Official Statistics Portal <https://osp.stat.gov.lt/nacionalines-saskaitos> as well.

Chapter 3. Overall QNA compilation approach

3.1. Overall compilation approach

3.1.1. General architecture of the QNA system

3.1.1.1. The first annual estimate is the sum of the quarters. Quarterly GDP is estimated by production, income and expenditure approaches. GDP calculations by production and expenditure approaches are considered to be the main approaches in LNA and are produced independently. The income approach is not an independent approach, since operating surplus and mixed income are derived as the residual item.

3.1.1.2. Compilation procedures of the QNA are carried out in stages. NA aggregates available in t+2 months after the end of reference quarter are estimated using econometric models. The estimations of NA aggregates at t+4 months are based on actual quarterly statistical data from the statistical surveys and administrative data sources. Revised quarterly GDP estimates at t+4 months are published along with the flash estimate of the next quarter.

3.1.1.3. The econometric methods used for estimations of the main components of GDP estimated by production, expenditure and income approaches at t+2 months are: a) multiple regression; b) Autoregression Model AR(p); c) q-th order moving average model MA (q); d) Autoregressive-moving average model ARMA (p, q); e) integrated autoregressive-moving average model ARIMA (p,d,q); f) ARIMAX (p,d,q) model.

a) Multiple regression:

$$Y_i(t) = \mu_i + \alpha_1 X_1(t-l) + \alpha_2 X_2(t-l) + \dots + \alpha_n X_n(t-l) + \beta_k S_k(t) + \tau_i Q_i(t) + \varepsilon_i(t),$$

here:

$Y_i(t)$ – the i -th GVA, main components of the expenditure or income approaches at time period t ;

t – time, $t = \overline{1, T}$, T – time series length;

μ_i – the average of the i -th main component of the production, expenditure or income approaches;

$X_j(t-l)$ – regressor, $j = \overline{1, n}$; $l = \overline{0, 4}$ – time lag;

$S_k(t)$ – seasonal variables, which are equal to 1 at first, second, third or fourth quarter, otherwise – 0, $k = \overline{1, 4}$;

$Q_i(t)$ – outliers: level shift or transitory change;

$\alpha_j, \beta_k, \tau_i$ – parameters of the model;

$\varepsilon_i(t)$ – random variables with Normal distribution. Model's parameters are estimated by Least Squares method.

If a significant regressor is not found or the necessary data are missing for the component of the value added, or regression model brings poor results, ARIMA family models (AR(p), MA(q), ARMA(p,q), ARIMA(p,d,q), ARIMAX(p,d,q)) are used.

b) Autoregression Model AR(p):

$$Y_i(t) = \mu_i + \varphi_1 Y_i(t-1) + \varphi_2 Y_i(t-2) + \dots + \varphi_p Y_i(t-p) + \varepsilon_i(t),$$

here φ_p – the parameters of the model indicating how the change of the past values of the indicator impacts the estimated indicator, $p = \overline{1, P}$;

c) q-th order moving average model MA (q):

$$Y_i(t) = \mu_i + \gamma_1 \varepsilon_i(t-1) + \gamma_2 \varepsilon_i(t-2) + \dots + \gamma_q \varepsilon_i(t-q) + \varepsilon_i(t),$$

here γ_q – the parameters of the model indicating how the change of the moving averages impacts the estimated indicator, $q = \overline{1, Q}$;

d) Autoregressive-moving average model ARMA (p, q):

$$Y_i(t) = \mu_i + \varphi_1 Y_i(t-1) + \varphi_2 Y_i(t-2) + \dots + \varphi_p Y_i(t-p) + \gamma_1 \varepsilon_i(t-1) + \gamma_2 \varepsilon_i(t-2) + \dots + \gamma_q \varepsilon_i(t-q) + \varepsilon_i(t)$$

e) Integrated autoregressive-moving average model ARIMA (p,d,q):

ARMA (p,q) model for d-th row differences of the statistical indicator $\Delta^d Y_i(t)$, if $d = 1$, then ARMA model is for the row, with members:

$$Z_i(t) = \Delta^d Y_i(t) = \Delta^1 Y_i(t) = Y_i(t) - Y_i(t-1).$$

General ARIMA (p,d,q) model:

$$\phi(L)(1-L)^d Y_i(t) = \theta(L) \varepsilon_i(t),$$

here $\phi(L) = (1 - \varphi_1 L - \varphi_2 L^2 \dots - \varphi_p L^p)$, $\theta(L) = (1 + \gamma_1 L + \dots + \gamma_q L^q)$ – polynomial with time lag L ;

f) ARIMAX (p,d,q) model:

is written as ARIMA (p,d,q) model with explanatory indicators $X_j(t)$:

$$\phi(L)(1-L)^d Y_i(t) = \Theta(L) X_j(t) + \theta(L) \varepsilon_i(t).$$

The quarterly time series of the estimated components and time series of the quarterly and monthly regressors are used for the estimations.

The regressors are taken of the same quarter as the estimated indicator or of the previous or the corresponding quarter of the previous year.

Various factors affect the estimated indicators (economic crises, structural changes, etc.), so the models include artificial variables: level shift or transitory change.

Some GDP components have seasonality, so seasonal variables are included in the models.

To ensure the quality of statistical data it is important to select the models that best describe the investigated time series. Therefore the most suitable and the best quality results producing models are selected using the determination coefficient R^2 :

$$R^2 = \frac{\sum_{t=1}^T (\hat{Y}_t - \bar{Y})^2}{\sum_{t=1}^T (Y_t - \bar{Y})^2}$$

here:

\hat{Y}_t – the estimate of the main GDP component;

\bar{Y} – the average of the main GDP component;

Y_t – actual value of the main GDP component.

3.1.1.4. For the third or the revised quarterly GDP data estimates at t+4 months the actual statistical and administrative data sources of quarter t are used; i.e. direct method is applied mainly. Data from quarterly statistical surveys by kind of activity are available as well as public finance statistics, BoP, agricultural statistics, banking and insurance statistics, data on W&S, labour force statistics.

3.1.1.5. Most important survey for the production and income approaches is the quarterly statistical survey on main financial indicators of non-financial enterprises.

3.2. Balancing, benchmarking and other reconciliation procedures

3.2.1. Quarterly GDP balancing procedure

3.2.1.1. In the LNA, the production and expenditure approaches are the main to determine the level of GDP. The third approach – the income approach – is also applied; nevertheless, it is not independent – the operating surplus and mixed income are derived residually. The GDP derived by three approaches is always balanced, and one GDP is published.

3.2.1.2. The balancing adjustments depend on the stage of GDP compilation. As already mentioned the GDP flash is estimated only by production side. On the second stage (at t+2 months) the level of GDP is determined by production side too; since the estimates of changes in stocks (as the expenditure component) are not available yet. All expenditure components are estimated on the third stage of GDP compilation. Only then, balancing is made. Usually, HFCE, changes in inventories or GVA are adjusted to get the final value of GDP at current prices.

3.2.2. Benchmarking of QNA and ANA

General approach

3.2.2.1. The first annual estimate is the sum of the quarters. When annual estimates of t-1 and t-2 year are made (end of September of year t), benchmarking of the four quarters of t-1 and t-2 years takes place. The four quarters are adjusted to the annual estimates using Pro-rata method. Preliminary quarterly estimates are multiplied by the ratio of ANA variable to the sum of the preliminary estimates of the four quarters.

$$X_t = I_t \cdot \frac{A_n}{I_{na}}$$

X_n – level of the benchmarked QNA estimate for quarter t;

I_n – level of the preliminary QNA estimate for quarter t;

A_n – level of the ANA estimate for year n;

I_{na} - sum of preliminary QNA estimates for year n.

Main specific cases of benchmarking

3.2.2.2. The main source for the NPISHs (S.15) is the annual survey of non-profit institutions. Information of this survey first of all has to be split to the quarters. ECOTRIM software is used for this split. A share of quarterly HFCE is applied to calculate indicators of the annual survey: wages and salaries, social contributions, taxes, intermediate consumption, income from sales and income from other activity. Forecasts of quarterly data for the current year on the basis of previous quarterly estimates are made using DEMETRA.

3.2.2.3. Annual CFC of each sector by activities is distributed over quarters using an empirical formula:

$$d1_T = (12 * D_T + 5 * D_{T-1} - 1 * D_{T+1}) / 64$$

$$d2_T = (20 * D_T - 1 * D_{T-1} - 3 * D_{T+1}) / 64$$

$$d3_T = (20 * D_T - 3 * D_{T-1} - 1 * D_{T+1}) / 64$$

$$d4_T = (12 * D_T + 5 * D_{T+1} - 1 * D_{T-1}) / 64$$

Q1: to Q4: Quarterly values of the first to fourth quarter, D_T : annual figures, T: reporting year

Whenever annual GFCF for (T; T+1) years are not yet available, estimates are made for annual P.51C outside of PIM by extrapolation method for missing years. The series of annual data are extended with assuming a continuation of the current trend in the data and fitting a quarterly series through the annual totals by the same method: smoothing the figures by taking into account preliminary previous year figures and forecast of reporting and next years.

3.2.3. Other reconciliations of QNA different from balancing and benchmarking

3.2.3.1. The BoP time series for the period of 1995-2003 were not revised according BPM6. Thus, the BoP statistics necessary for NA compilation was back casted in order to ensure coherence between those two data sets for 1995-2003. The linear regression was used for back calculations:

$$y_t = \mu_t + \alpha_1 x_{1,t-l} + \alpha_2 x_{2,t-l} + \dots + \alpha_n x_{n,t-l} + \beta_k S_{k,t} + \tau O_t + \varepsilon_t$$

here, y_t is dependent variable, time series of the back-casting indicator at time – t, $t = (1, \dots, T)'$, T is time series length, μ_t – trend, $x_{j,t-l}$ – regressor j, $j = \overline{1, n}$, with a time lag $l = (0, 1, \dots)$, $S_{k,t}$ – seasonal variables, which are equal to 1 if quarter depends to first, second, third or fourth season, otherwise – 0, $k = (1, \dots, 4)$, O_t represents outliers: additive outlier, level shift or transitory change; α_j , β_k , τ are model parameters, coefficients of regressors, $\varepsilon_t \sim N(0, \sigma^2)$ is random disturbance.

Backward calculations of the series are derived using recursion principle after estimation of linear regression parameters:

$$\hat{y}_{t-j} = \hat{\mu}_t + \hat{\alpha}_1 x_{1,t} + \dots + \hat{\alpha}_n x_{n,t}$$

$$j \in \{1, 2, \dots, M-1, M-2, M\}.$$

3.2.3.2. The reconciliation of quarterly NPISH data to annual figures is made using the ECOTRIM software.

3.2.4. Amount of estimation in various releases

3.2.4.1. Besides the flash estimates, Lithuanian QNA indicators are estimated at t+2 and at t+4 months after the reference quarter. There are essential differences in sources and methods used. Because of the lack of information from direct data sources the estimates at t+2 are based on econometric models. At t+4 months the actual quarterly statistical and administrative data sources are used. Detailed data from business surveys by kind of activity are available. The public finance statistics, BoP, data on W&S also are available.

3.2.4.2. At t+2 months almost all statistical data used in econometric models (about 85 per cent) as the regressors for GVA estimations is available except information from of state and municipalities budgets, provided by the MoF. These components are extrapolated.

3.2.4.3. For GDP components estimated by expenditure approach the econometric models are used for the estimation of HFCE and NPISH's, as well as general government. Direct information is available for Exports and Imports of goods and services and some components of GFCF. Changes in inventories are estimated residually at this stage.

3.2.4.4. For income approach the compensation of employees, taxes on production and imports and subsidies on production and imports are estimated using the econometric models. No direct information is available at this stage.

3.2.4.5. At t+4 months GDP estimate by production approach is made mainly using direct data sources (for S.11, S.12 and S.13) and modelling is performed for remaining part (S.14 and S.15).

3.2.4.6. The components of expenditure approach are mainly based on direct monthly and quarterly data sources. However, some benchmarking is performed for HFCE and NPISH. While HBS is currently carried out every four years; survey data is benchmarked for the missing periods.

3.2.4.7. For the components of income approach the estimates mainly based on direct data sources, that is, sample surveys and administrative records. Taxes on production and imports and subsidies on production and imports at this stage are available from State budget and Municipalities budget.

3.3. Volume estimates

3.3.1. General volume policy

3.3.1.1. The volume and growth rates of the main components of quarterly GDP estimated by production and expenditure approaches are estimated using Laspeyres volume index. The Laspeyres volume index is the ratio between the estimated actual value of statistical indicator at previous year

prices at period T and the actual value of statistical indicator at current prices for the selected base period T_0 :

$$LQ^T = \frac{\sum_i^n P_i^{T_0} Q_i^T}{\sum_i^n P_i^{T_0} Q_i^{T_0}} = \sum_i^n \frac{P_i^{T_0} Q_i^{T_0}}{\sum_i^n P_i^{T_0} Q_i^{T_0}} \times \frac{Q_i^T}{Q_i^{T_0}} = \sum_i^n w_i^{T_0} \times \frac{Q_i^T}{Q_i^{T_0}},$$

here:

LQ^T – Laspeyres volume index at the year T ;

$w_i^{T_0} = v_i^{T_0} / \sum_i^n v_i^{T_0}$ – the weight of the i -th estimated statistical indicator at the base period, here
 $v_i^{T_0} = P_i^{T_0} Q_i^{T_0}$ – the volume of the i -th estimated statistical indicator at the base period;

Q_i^T and $Q_i^{T_0}$ – the volumes of the i -th estimated statistical indicator at the reference period (at the year T) and base period;

$P_i^{T_0}$ – the price of the i -th estimated statistical indicator at the base period;

$P_i^{T_0} Q_i^{T_0}$ – the value of the i -th estimated statistical indicator at the reference period at the prices of base period;

$P_i^{T_0} Q_i^{T_0}$ – the value of the i -th estimated statistical indicator at the current prices.

The Laspeyres volume index linking different base periods with the reference year r estimated by the chain linking is formed:

$$CLQ^T = \frac{\sum_i^n P_i^r Q_i^{r+1}}{\sum_i^n P_i^r Q_i^r} \times \frac{\sum_i^n P_i^{r+1} Q_i^{r+2}}{\sum_i^n P_i^{r+1} Q_i^{r+1}} \times \dots \times \frac{\sum_i^n P_i^{T_0} Q_i^T}{\sum_i^n P_i^{T_0} Q_i^{T_0}}$$

or

$$CLQ^T = LQ^{r \rightarrow r+1} \times LQ^{r+1 \rightarrow r+2} \times \dots \times LQ^{T-1 \rightarrow T} = CLQ^{T-1} \times LQ^T$$

An overlap method is then used, which ensures the additivity of quarterly data to the annual.

$$LQ^{q,T} = \frac{\sum_i P_i^{T-1} Q_i^{q,T}}{\sum_i P_i^{T-1} Q_i^{T-1} / 4}$$

here:

$LQ^{q,T}$ – The Laspeyres volume index of the year t quarter q ;

$Q_i^{q,T}$ or Q_i^{T-1} – the amounts of the i -th estimated statistical indicator at quarter q of the year T and of the year $T - 1$ respectively;

P_i^{T-1} – the price of the i -th estimated statistical indicator at period $T - 1$;

$P_i^{T-1}Q_i^{q,T}$ – the volume of the i -th estimated statistical indicator at the year T quarter q ;

$P_i^{T-1}Q_i^{T-1}/4$ – the value of the i -th estimated statistical indicator at the previous year and at the current prices.

The Laspeyres volume index estimated at chain linking is formed:

$$CLQ^{q,T} = \frac{\sum_i^n P_i^r Q_i^{r+1}}{\sum_i^n P_i^r Q_i^r} \times \frac{\sum_i^n P_i^{r+1} Q_i^{r+2}}{\sum_i^n P_i^{r+1} Q_i^{r+1}} \times \dots \times \frac{\sum_i^n P_i^{T_0} Q_i^{q,T}}{\sum_i^n P_i^{T_0} Q_i^{T_0}}$$

or

$$CLQ^{q,T} = CLQ^{q,T-1} \times LQ^{q,T},$$

here $CLQ^{q,T}$ – the Laspeyres volume index estimated at chain linking of quarter q of the year T .

3.3.1.2. SL publishes the chain linked volumes of GDP components that are not additive. The explanation on non-additivity is provided in the metadata.

3.3.2. Chain-linking and benchmarking

3.3.2.1 Pro-rata method is used for benchmarking (as described in chapter 3.2.2) of quarterly data at previous year prices and chain-linked volume.

3.3.3. Chain-linking and seasonal adjustment

3.3.3.1. For the compilation of seasonally-adjusted chain-linked volumes the program *DEMETRA* and *TRAMO/SEATS* method is used. Direct approach is used for the seasonal adjustment.

3.4. Seasonal and calendar adjustment

3.4.0.1. Method *TRAMO/SEATS* of the program *DEMETRA+* is used for the seasonal and calendar adjustment at current prices and chain-linked volume for GDP components (by production and expenditure approaches) and at current prices for GDP components (by income approach). Indirect method is used for the seasonal and calendar adjustment at current prices and direct method is used for the seasonal and calendar adjustment for chain-linked volume.

3.4.0.2. Seasonality is intrinsically an unobserved component in time series. Consequently, all seasonal adjustment methods are based on a model that decomposes the unadjusted data into a trend, seasonal component, cycle component and non-seasonal unobserved components on the basis of a set of assumptions of their characteristics. Mathematically the elimination of the seasonal component can be written as follows:

- a time series model of the statistical indicator is created: $x_x = T_t + S_t + C_t + \varepsilon_t$;
 $x_t = f(T_t, S_t, C_t) + \varepsilon_t$
 where T_t is the trend component, S_t is the seasonal component, C_t is the cyclical component, ε_t - random component;

- estimated model components $\tilde{T}_t, \tilde{S}_t, \tilde{C}_t, \tilde{\varepsilon}_t$ (for example $\tilde{S}_t = \varphi m_t + \xi_t$ – estimated seasonal component using certain model, here m_t is the regressor, φ the parameter of the model, ξ_t – random variables with Normal distribution and average 0);
- eliminated seasonal component: $\tilde{x}_x = x_t - \tilde{S}_t = \tilde{T}_t + \tilde{S}_t + \tilde{C}_t + \tilde{\varepsilon}_t - \tilde{S}_t = \tilde{T}_t + \tilde{C}_t + \tilde{\varepsilon}_t$.

3.4.0.3. In LNA there are many possible hierarchical relationships: regional, industrial, commodity, accounting, etc. This raises the issue as to how aggregates should be seasonally adjusted: directly, by seasonally adjusting every QNA variable independently, or indirectly, by seasonally adjusting an aggregate as the sum of its seasonally adjusted components.

If considered that time series is A_t, B_t, C_t, D_t and the aggregated time series is E_t :

$$E_t = A_t + B_t + C_t + D_t.$$

The **direct method** means that the seasonal components of all time series including the aggregated data are eliminated independently:

$$SA(A_t), SA(B_t), SA(C_t), SA(D_t), SA(E_t).$$

The **indirect method** means that the seasonally adjustment of the aggregated time series is made by summing up the directly seasonally adjusted data of two or more time series:

$$SA(E_t) = SA(A_t) + SA(B_t) + SA(C_t) + SA(D_t).$$

3.4.0.4. The impact of the number of working days is reflected in time series of the most statistical indicators, since the number of working days is different each month. The calendar month consists of four weeks (28 days), adding an extra one, two, or three days.

Moving holidays, which occur once a year, but the date varies, may affect different months and quarters. This influence can be gradual, it can have an impact on the days before and after the event, for example, Easter can affect chocolate, egg sales, etc.

It is determined whether the time series are influenced by working days, leap-year, moving holidays, and holidays of fixed dates. If necessary, the following regressors are included in the model. In order to evaluate the influence of working days, fictitious variables $u_1, u_2, u_3, \dots, u_{9t}$ are introduced: for seven days of the week, there are separate variables, which are equal to the sum of the corresponding days of the week during the period; two additional variables are for the leap-year and the celebrations. The model is used:

$$x_t = \beta_1 \cdot u_{1t} + \dots + \beta_9 \cdot u_{9t} + wda_t,$$

here β_i , $i = 1, 2, \dots, 9$, is unknown parameters, and wda_t is the time series of the calendar adjusted values of the indicator. Since the parameters are dependent, therefore, for many indicators, not all parameters are significant and fewer variables can be used. Then additive model is:

$$x_t = \alpha_1 \cdot w_t + \alpha_2 \cdot h_t + wda_t,$$

here w_t - the number of working days in the observed time period, h_t - the number of days offs in the observed time period.

3.4.0.5. Seasonally and calendar adjusted GDP as well as non-adjusted data are published in the press release and placed in the database. Adjusted data of all components at current prices and chain-linked volume is transmitted to Eurostat. Also changes of seasonal adjusted series (chain-linked volume) are placed to users.

3.4.1. Policy for seasonal adjustment

3.4.1.1. The TRAMO/SEATS method, implemented in the DEMETRA+ software package, is applied for seasonal adjustment. The settings of the seasonal adjustment (pre-treatment) are analysed and updated twice a year in February having a full year and in September at the revision of provisional annual figures. The outliers and calendar effects are determined once a year in order to minimize revisions during that year. Also the shape of the Arima model and its coefficients are kept constant during that year. If necessary new outliers are found in the most recent data, they are added to seasonal adjustment settings during the year.

3.4.2. Policy for calendar adjustment

3.4.2.1. Calendar adjustment is performed as a part of the process of producing seasonally adjusted data and is the element of pre-treatment in the seasonal adjustment procedure. To treat calendar effect regression approach is used. In the analysis and extraction of calendar effects the national Lithuanian calendar of holidays is used.

3.4.3. Revision policy for seasonally adjusted data

3.4.3.1. The time series of seasonally adjusted data is revised when the original data is revised or time line pattern is inaccurate, the model does not meet the qualitative criteria or its parameters are statistically insignificant. Seasonally adjusted data, models are revised and updated based on the current adjustment with review on annual basis.

Chapter 4. GDP components: the production approach

GDP by production approach is estimated in three stages– flash estimate, second estimate and third estimate. GDP flash estimate is described in Chapter 8.

Second estimate is based on econometric methods and is published in approximately t+2 months after the end of the reference quarter. Data presented is broken down by A*10 aggregation level at current prices, previous year prices and chain-linked volumes.

Third estimate is based on the actual statistical or administrative data sources and is published in approximately t+4 months after the end of the reference quarter along with the flash estimate for the next quarter. The data presented is of the same scope as in the publication of second estimate.

4.0. GDP estimates

Second estimate t + 2 months

4.0.1. The GVA by production approach at current prices and volume estimates are derived using multiple regression, autoregressive (AR) and ARIMAX models. Despite the breakdown by A*10 of kind of activity is published, the more detailed estimates are made.

4.0.2. For estimation of GVA by industries, additional different explanatory indicators – regressors are used: production or turnover from STS, number of employees in full time units, average salary, income and etc. In all models seasonal factors are used. In order to ensure the quality of the estimates the following criteria and analysis are employed: models' accuracy criteria (determination coefficient, significance of parameters, analysis of errors) are checked, expert analysis. Taxes less subsidies are estimated indirectly. Annex 1 presents indicators which are used to estimate the value added by activities.

4.0.3. Data from public institutions (published by the MoF, BoL, STI) is used as additional source of information.

4.0.4. The second estimate of GDP by production approach is compared with the GDP estimated by expenditure. If necessary, estimated GDP is corrected. However, the real GDP growth is determined from the production approach.

Third estimate t+4 months

4.0.5. The third GDP estimate is produced using available direct data sources (for S.11, S.12 and S.13) and modelling the rest part. The estimates are made at two digit level by NACE rev.2.

4.0.6. Gross output and intermediate consumption are estimated at current prices and GVA is derived as a difference. GDP at market prices is derived by adding taxes on products and subtracting subsidies on products to GVA.

4.0.7. For the valuation of non-market output, total costs of production are taken into account, i.e. the sum of:

- Intermediate consumption,
- Compensation of employees,
- Consumption of fixed capital and
- Other taxes on production less other subsidies on production.

4.0.8. GVA by kind of activities at previous year prices is estimated by extrapolation of value added by volume index of output. Annual overlap technique is applied for chain linking of quarterly data. The year of 2010 is a reference year at present.

4.1. Gross value added, including industry breakdowns

4.1.1. Agriculture, forestry and fishing (NACE Rev. 2 Section A)

4.1.1.1. Estimates of Output, intermediate consumption and value added are specific in LNA. The main sources for estimates of indicators for agriculture are:

- 1) The data of EAA for previous (n -1) year (data from Agrarian Institute of Economics);
- 2) Quarterly statistical surveys conducted by SL: the number of livestock and animal production in agricultural companies and enterprises (ŽŪ-24); main financial indicators of agricultural enterprises (F-18); purchase prices of the means of agricultural production (ŽŪ-20) and other;

3) Monthly forecasts and data on direct payments provided by Ministry of Agriculture.

4.1.1.2. Output of agriculture is calculated applying the volume index of production and producer (purchase) price index.

4.1.1.3. Every quarter different products, received and produced within reporting period by all kinds of producers, are evaluated, for example: I quarter – greenhouse vegetables and animal products; II quarter – vegetables, strawberries, hay, animal products; III quarter – grain, potatoes, field vegetables, rapeseed, animal products; IV quarter – vegetables, fodder beet, animal products. For the calculation of volume index of agricultural production the producer prices are used.

4.1.1.4. Quarterly volume index of agricultural production is calculated comparing production of different agricultural products in reporting quarter against the production in corresponding quarter of previous year, evaluated at producer prices of corresponding quarter of previous year. In other words, production volumes of the current period evaluated at corresponding period of previous year prices divided by producer prices and volumes of products of corresponding period of previous year.

4.1.1.5. For the estimation of production at basic prices the subsidies on products in current quarter are added as well as related services and secondary activities at basic prices.

4.1.1.6. Then, the distribution of production by institutional sectors is required in NA. For the calculation of output, intermediate consumption and value added of the sector of non-financial enterprises (S.11) in agriculture and in related services the data of quarterly report F-18 is used.

4.1.1.7. The production of household sector, i.e. in farmer's and family farms, (S.14) is received as the difference between total production and the sector S.11.

4.1.1.8. Intermediate consumption for the sector S.11 is taken from the quarterly report of agricultural companies and enterprises F-18. For the estimation of intermediate consumption in farmer's and family farms the EAA data of previous (n-1) year are used. The calculation of elements of intermediate consumption as for example, purchases of energy and fuel, purchases of raw material and services are based on percentage structure of expenditure elements from (n-1) annual data, taking into account price indices of material resources for the reporting period.

4.1.1.9. Gross value added is estimated as difference between output and intermediate consumption.

4.1.2. Activities from A (Forestry and logging; fishing and aquaculture), B, C, D, E, F, G, H, I, J, L, M, N, (O, P, Q – market part), (R, S, T – market part)

Estimates at current prices

4.1.2.1. Similar approach is used to estimate quarterly value added for most kind of activities. The main source is the quarterly statistical survey on main financial indicators of non-financial enterprises, which is the basis for direct estimation of output and intermediate consumption in S.11 at current prices. The value added for S.14 is measured indirectly; i.e. is based on annual estimates. Conceptual adjustments, considering own-account intellectual property products, holding gains/losses and other are made to source data as well as adjustment for exhaustiveness. They all are derived from annual data.

Volume estimates

4.1.2.2. Value added is estimated extrapolating value added of the previous quarter by volume index of output.

4.1.3. Financial and insurance activities (NACE Rev. 2 Section K)

4.1.3.1. Value added for Financial and insurance activities is estimated based on direct data sources. Quarterly data provided by BoL is as follows: Balance sheets and profit (loss) statements of the BoL itself, commercial banks and foreign bank branches operating in Lithuania, central credit union of Lithuania and credit unions, management and financial brokerage companies; Income and expense statements of collective investment subjects; Aggregated balance sheet and profit and loss account of insurance companies; Monthly statistics on insurance activity results; Statements of net assets and changes in net assets of pension funds. The remaining companies of financial sector report directly to SL.

4.1.3.2. The output of CB is measured as the sum of costs. The intermediate consumption of the CB is calculated as a sum of these components: office equipment maintenance expenses, raising qualification and business trip expenses, administrative expenses (transport, post and communication services expenses), other operational expenses (banknote and coin production and circulation expenses), commissions and fee expenses, other expenses. Value added of CB is estimated as the sum of compensation of employees, other taxes on production and CFC.

4.1.3.3. Output of financial services provided by commercial banks, credit unions and central credit union (NACE 64.19) is estimated from their profit (loss) statements.

4.1.3.4. Quarterly estimates of output of financial services provided by remaining companies of Financial service activities, except insurance and pension funding (NACE 64) is estimated from quarterly statistical survey on activity of financial intermediation enterprises F-03.

4.1.3.5. The output (of S.12 sector) of the activities auxiliary to financial services and insurance activities (NACE 66) is made up of income from commissions, management and customer servicing activity and income from other activity.

4.1.3.6. Intermediate consumption of commercial banks and credit unions is calculated as the sum of relevant expenses from their profit (loss) statements.

4.1.3.7. Intermediate consumption of remaining companies in activities NACE 64 and NACE 66 covers rent of long-term tangible assets, expenses for services, business trip expenses, other material costs, commissions expenses, other operating expenses.

4.1.3.8. The value added for S.14 is measured indirectly; i.e. is based on annual estimates

Financial services provided in insurance and pension schemes

4.1.3.9. In LNA, financial services provided in insurance and pension schemes are estimated separately for non-life insurance; life insurance; reinsurance; pension funding. Insurance services are estimated using supervisory data provided by Supervision Service of BoL: aggregated balance sheet and profit and loss account of insurance companies and monthly statistics on insurance activity results.

4.1.3.10. In addition, in the estimation of NA indicators of insurance sector, data from the annual questionnaire on activity of insurance companies (F-02), collected by SL is used.

4.1.3.11. The output of direct insurance is estimated gross of reinsurance. The output of direct non-life insurance services is estimated according to the formula: premiums earned *plus* premium supplements *minus* adjusted claims incurred. Non-life insurance claims incurred were adjusted using the method suggested in the ESA 2010 §16.39, named expectation approach. Adjusted claims were derived statistically using historical data on claims, taken from monthly statistics on insurance activity results.

4.1.3.12. The output of direct life insurance services is calculated as follows: premiums earned *plus* premium supplements *minus* benefits due *minus* increases (plus decreases) in technical reserves and with-profits insurance (ESA 2010 §16.52).

4.1.3.13. The output of reinsurance is calculated as follows: premiums earned *less* commissions payable *plus* premium supplements *minus* both adjusted claims incurred and profit sharing (ESA 2010 §16.56). The whole of the output of the reinsurer is intermediate consumption of the direct insurer holding the reinsurance policy. There are no reinsurance corporations in Lithuania, so the output of reinsurance represents imports of services.

4.1.3.14. Intermediate consumption of direct life and non-life insurers is calculated as the sum of reinsurance output and the sum of these components: rent of long-term tangible assets, expenses for services, business trip expenses, commissions for total insurance business, other material costs.

4.1.3.15. LNA estimates services of pension funds using Statements of net assets and changes in net assets of second and third pillar pension funds, provided quarterly by the Supervision Service of BoL. The approach used in LNA for the estimation of the main aggregates for pension schemes is that the output is equal to the management costs of the funds and to the intermediate consumption. This approach is used because pension funds are not separate legal entities; they have no employees and are managed by management or insurance companies for a management fee.

Volume estimates

4.1.3.16. Output is extrapolated using volume indices, which are formed using wages and salaries and employment indicators.

4.1.4. Real estate activities L (actual and imputed rentals)

Estimates at current prices

4.1.4.1. In section L, separately from real estate activities, dwelling services (actual and imputed rentals) are distinguished. Quarterly dwelling estimates are based on mathematic-statistical approaches, using annual t-1 data and all available information on dwellings from STS.

Volume estimates

4.1.4.2. For the dwelling services, value added is extrapolated using the volume indices of changes in stock of dwellings.

4.1.5. Public administration and defence; compulsory social security; education; human health and social work activities, and Arts, entertainment and recreation; (NACE Rev. 2 Section O, P, Q and R)

Estimates of non-market market part at current prices

4.1.5.1. Estimates are based on direct data sources. Information on government revenues and expenditures of the central and local government provided by the MoF serves as the main base.

Volume estimates

4.1.10.7. Value added for Public administration and defence, Education, Health and social work and Arts, entertainment and recreation is extrapolated using volume index, which is formed using wages and salaries and employment indicators.

4.2. FISIM

4.2.1. FISIM is estimated and allocated to user sectors on quarterly basis according to the requirements of the Council Regulation 448/98, the Commission Regulation 1889/2002 and the ESA 2010 Chapter 14. Further on FISIM is allocated to the NACE activities according to their output structure in the appropriate sector. In this way calculated amount of FISIM is added to the intermediate consumption by kind of activities. Annual FISIM estimates are equal to the sum of quarters. Nevertheless, quarterly results are adjusted when the final data became available.

4.2.2. According to the agreement, BoL provides regularly agreed information for the calculation of FISIM and, on the other hand, receives data on components of imported and exported FISIM required for BoP compilation. Quarterly data sources from BoL used for the estimation and allocation of FISIM are: Monetary financial institutions (MFI) balance sheet and interest rate statistics; Interbank interest rate statistics; BoP.

4.2.3. FISIM are produced by deposit-taking corporations except the central bank (S.122) and other financial intermediaries, except insurance corporations and pension funds (S.125).

4.2.4. In the estimation and allocation of domestic FISIM, firstly, internal reference rate (IRR) is calculated as the ratio of interest receivable on loans within and between subsectors S.122 and S.125 to stocks of loans within and between subsectors S.122 and S.125.

4.2.5. Domestic FISIM is estimated and allocated to each user sector and/or subsector separately using sectorised stocks of deposits and loans granted by the resident FIs and corresponding accrued interest. The total FISIM by institutional sector is obtained as the sum of FISIM on loans granted to the institutional sector and FISIM on deposits of the institutional sector (ESA 2010 §14.11).

FISIM on loans granted to the institutional sector is estimated as:

$$FISIM\ on\ loans = interest\ receivable\ on\ loans - loan\ stocks * IRR$$

FISIM on deposits of the institutional sector is estimated as:

$$FISIM\ on\ deposits = deposit\ stocks * IRR - interest\ payable\ on\ deposits$$

4.2.6. FISIM attributable to households is broken down into the following categories: intermediate consumption of households in their capacity as owners of dwellings, intermediate consumption of households in their capacity as owners of unincorporated enterprises and final consumption of households.

4.2.7. Exports of FISIM are estimated as the sum of FISIM on loans granted by resident FIs to non-residents (excluding FIs) and FISIM on deposits of non-residents (excluding FIs) held in resident banks.

4.2.8. Exported FISIM on loans to non-residents (excluding FIs) is estimated as:

*FISIM on loans = interest receivable on loans - loan stocks*ERR*

4.2.9. Exported FISIM on deposits of non-residents (excluding FIs) is estimated as:

*FISIM on deposits = deposit stocks*ERR - interest payable on deposits*

4.2.10. According to ESA 2010 §14.10, external reference rate (ERR) is calculated as the ratio of interest on loans plus interest on deposits between resident FIs and non-resident FIs, to the stock of loans plus the stock of deposits between resident FIs and non-resident FIs

4.2.11. Imported FISIM is estimated and allocated for each resident institutional sector and/or subsector separately. The total FISIM imported by the institutional sector is obtained as the sum of FISIM on loans granted by non-resident FIs to the institutional sector and FISIM on deposits of the institutional sector held in non-resident FIs.

4.2.12. Imported FISIM on loans granted by non-resident FIs is estimated as:

*FISIM on loans = interest receivable on loans - loan stocks*ERR*

4.2.13. Imported FISIM on deposits held by residents in RoW is estimated as:

*FISIM on deposits = deposit stocks*ERR - interest payable on deposits*

4.3. Taxes less subsidies on products

4.3.1. Net taxes on products are obtained by deducting subsidies on products (D.31) from taxes on products (D.21). Direct data sources are available.

4.3.2 Estimates of taxes on products are based on the quarterly administrative data sources, i.e. information from the tax authorities, central and local government budget executions. The data are obtained on cash and based on national classification on taxes and other revenue for budgetary institutions. The simple time - adjustment is made every quarter for accruals of VAT and excises. The methods used to compile data on a quarterly basis are consistent with the methods used to compile annual data.

4.3.3. The main data sources for estimation of subsidies on products (D.31) are quarterly central and local government budget reports and data on subsidies for agriculture from EU Funds, which are obtained from the MoF. These sources are available on cash basis. It is possible to reallocate the data to the time of transaction using the additional data source - report of the Ministry of Agriculture. This report contains data on subsidies broken down by periods they relate to. An adjustment is made on the subsidies, in order to record them at the time when the transaction occurs.

Chapter 5. GDP components: the expenditure approach

Quarterly GDP by expenditure approach is estimated in two stages – for the second and the third GDP estimate, there is no flash estimate made for GDP expenditure components.

GDP components by expenditure approach are estimated at current prices, previous year prices and as chain-linked volumes, using annual overlap method.

Seasonal and calendar adjustments are made for GDP expenditure components as required.

Second GDP estimate is published at t+2 months after the end of reference quarter, while the third estimate at t+4 months along with the flash estimate of the next quarter. The same level of details is published for the second and third estimate.

Second estimate t + 2 months

Estimation at current prices

5.0.1. The methods for calculation of the second GDP estimate at current prices are different from the methods used for the GDP estimation for t+4 months. The econometric models, namely multiple regressions, are used for the estimation of some GDP components: HFCE and NPISH's, as well as of general government.

5.0.2. Regressors used to estimate expenditure components are: quarterly information on average monthly earnings, quarterly information on turnover in retail trade and catering enterprises, quarterly statistical information on income for services provided to population, quarterly information on income of National Budget and etc. Table below presents the list of regressors which are used to estimate the expenditure components.

Table 1. The list of regressors groups used for expenditure approach

| | Aggregates | Regressors groups | Remarks |
|---|---|---|--|
| 1 | Final consumption expenditure of households and NPISH's | Quarterly information on average monthly earnings; Quarterly information on turnover in retail trade and catering enterprises; Quarterly statistical information on income for services provided to population; Trend; Seasonal factors. | Final consumption expenditure of NPISH's are not estimated separately for the second estimate of GDP |
| 2 | Final consumption expenditure of general Government consumption expenditure | Quarterly information on income of National Budget; Quarterly information on investment in tangible fixed assets in the economy; Value of production in Public administration and defence; compulsory social security for corresponding quarter; Trend; Seasonal factors. | Individual and collective expenditures are estimated separately. |

5.0.3. The breakdowns of GDP expenditure components are the same as used for the GDP estimate at t+4 months.

5.0.4. In the quarterly estimation of GFCF, the following breakdown by type of asset is used: AN.111 dwellings, AN.112 other building and structures; AN.113+AN.114 machinery and equipment + weapon systems (AN.1131 transport equipment; AN.1132 ICT equipment; AN.1139+AN.114 other machinery and equipment + weapon systems); AN.115 cultivated biological resources; AN.117 intellectual property products. As the methods and data sources for estimation of GFCF for the second (t+2 months) and third (t+4 months) estimates does not differ, please see paragraph 5.4.1 for the details.

5.0.5. Changes in inventories are estimated as residual between GDP, estimated by production approach, and sum of expenditure components.

5.0.6. Acquisitions less disposals of valuables are estimated using commodity flow method, the data from foreign trade statistics and domestic industries statistics are used for this purpose.

5.0.7. The direct method is used for the estimation of exports and imports of goods and services taking them from the monthly BoP.

Estimation at previous year prices

5.0.8. CIPI's, EPI's, IPI's, PPI, SPPI's, CPI's, implicit deflators as well as volume indices are used for the estimation of GDP components at previous year prices.

Third estimate t+4 months

5.0.9. Even though the methods used for the estimation of quarterly GDP are similar to the methods used for the annual estimation of GDP expenditure components, it is usually completed at lesser level of details.

5.0.10. The value of quarterly GDP, estimated by expenditure approach, is balanced with the results of quarterly GDP, estimated by production approach, making the adjustments for some groups of goods and services of HFCE and, mainly, changes in inventories.

5.0.11. The quarterly data are revised, when the annual data are available. The revised quarterly estimates are fully consistent with the annual estimates.

5.1. Household final consumption expenditure

Estimation at current prices

5.1.1. The quarterly estimates of HFCE basically follow the same scheme of calculations as the annual estimates. The compilation is based on COICOP at class level. Estimates are made using the tabular approach. This set of analytical tables in consecutive order shows the transition way from initial data and all adjustments made by each source used. According to these analytical tables estimates of HFCE are being constructed basing on the reliability, from a variety of independent sources. There are some cases where a combination of sources is used to make the best estimation for the division.

5.1.2. HFCE estimates mainly are based on data from monthly survey on retail trade turnover (RT); quarterly survey on market services, on quarterly level of information from the latest

annual HBS and quarterly data from the BoP. In addition, quarterly data from output of the particular activities for GDP estimates by production approach and other statistical sources are used.

5.1.3. HBS is currently carried out every four years; the latest survey is for the year 2016. The 2012 survey was used as a benchmark for the years 2011–2014 and the 2016 survey respectively for the year 2015 and onwards.

5.1.4. The data sources used for HFCE estimation are adjusted for statistical, coverage and definitional reasons before taken them into final estimates of HFCE.

Estimation at previous year prices

5.1.5. The corresponding CPI's are used for deflation purposes to calculate the HFCE classes at previous year prices.

5.2. General government final consumption expenditure

Estimation at current prices

5.2.1. The direct data sources are used for the estimation of individual (P.31) and collective (P.32) consumption expenditure of general government. The split between individual and collective consumption expenditure is drawn on the basis of quarterly data, provided by the MoF and the Social Security Funds (SSF). The MoF provides data on the State (central government) budget revenue and expenditure, the local government budget revenue and expenditure and the extra-budgetary funds. The source data from the MoF are broken down by economic and functional (COFOG 2nd level) classifications of expenditure. Data provided by the SSF are allocated to Health (07) and Social Protection (10) divisions. In addition, quarterly financial statements are used for public health care and public higher education institutions, they are recorded as P.31. Quarterly statistical surveys and financial statements are used for public enterprises included in general government sector, they are recorded as P.32. The methods used to compile data on a quarterly basis are consistent with the methods used to compile annual data.

5.2.2. FCE of general government is valued at the costs of production. Final consumption expenditure (P.3) is equal to the sum of their output (P.1), plus the expenditure on products supplied to households via market producers, part of social transfers in kind (D.6311 + D.63121 + D.63131), minus the payments by other units, market output (P.11) and own-account capital formation (P.12) and minus payments for the other non-market output (P.131).

5.2.3. The split to individual and collective consumption expenditure is done according to functional classification of expenses.

5.2.4. Individual consumption expenditure consists of these COFOG divisions:

- 07 – Health (07.1 – 07.4 groups)
- 08 – Recreation, culture and religion (08.1-08.2 groups)
- 09 – Education (09.1 – 09.6 groups)
- 10 – Social protection (10.1 – 10.7 groups)

5.2.5. Collective consumption expenditures are calculated as the residual item, i.e. as the difference between total final consumption expenditure of general government and individual consumption expenditure.

Estimation at previous year prices

5.2.6 Implicit deflators of non-market output of corresponding industries are used for deflation of individual and collective consumption expenditure of general government.

5.3. Final consumption expenditure of non-profit institutions serving households

5.3.1. FCE of NPISHs is not a considerable part of GDP, it is estimated at current and previous year prices.

5.3.2. The principal data source used for final consumption of NPISH is annual survey of Non-profit institutions conducted by SL. All non-profit institutions, which are registered as non-profit institutions S.15, fill in the annual report F-16. In addition to that information from annual survey on religious communities and societies, as well information from administrative data sources, such as State Social Insurance Fund, Centre of Registers is also used.

5.3.3. Quarterly estimates are produced by splitting annual $t-1$, $t-2$ data using ECOTRIM software and forecasted for the current year quarters using DEMETRA software.

5.3.4. The estimates at previous year prices are calculated using above mentioned techniques.

5.4. Gross capital formation

5.4.1. Gross fixed capital formation

Estimation at current prices

5.4.1.1. In the quarterly calculations of GFCF, the following breakdown by type of asset is used: dwellings, other buildings and structures, machinery and equipment (incl. transport equipment, ICT equipment, other machinery and equipment) + weapons systems, cultivated biological resources, intellectual property products.

5.4.1.2. The estimation of capital spending on construction is based on the output of construction industry with the adjustment for current repairs. Transfer costs and VAT are also included.

5.4.1.3. Estimates of GFCF of dwellings (AN.111) are based on direct data sources and other buildings and structures (AN.112) are estimated as the difference between capital spending on construction and capital spending on dwellings.

5.4.1.4. Machinery and equipment (AN.113) components (transport equipment (AN.1131), ICT equipment (AN.1132), other machinery and equipment (AN.1139)) are calculated using the commodity flow method. It is based on foreign trade statistics on imports and exports and statistical questionnaire on enterprises' production. Exports are deducted from domestic output and imports. In order to obtain purchaser's prices, the distribution margins, other costs of transfer and the non-deductible VAT are added.

5.4.1.5. Data on Weapons systems (AN.114) are directly obtained from the State budget.

5.4.1.6. The calculation of cultivated biological resources (AN.115) is based on the surveys on agricultural companies and farms. The quarterly estimates of cultivated biological resources are made indirectly based on relations from annual basis.

5.4.1.7. Estimates of Intellectual property products (AN.117) components (research and development (AN.1171), mineral exploration and evaluation (AN.1172), computer software (AN.11731) and databases (AN.11732), entertainment, literary and artistic originals (AN.1174)) are based on relations from annual basis.

Estimation at previous year prices

5.4.1.8. The estimates at previous year prices are mainly derived through deflation of values at current prices. The appropriate CIPI's, PPI's, IPI's, SPPI's and CPI's are used for the components of GFCF except of the cultivated biological resources. Volume indices are used for the estimation of the cultivated biological resources at previous year prices.

5.4.2. Changes in inventories

5.4.2.1. The main data sources for the estimation of changes in inventories are the quarterly survey of the main financial indicators of enterprises, quarterly survey of main financial indicators of agricultural companies and enterprises engaged in agricultural, animal and crop production services, inseparable non-agricultural secondary activities. In addition to that information from State budget is used as well. The surveys provide data on opening and closing stocks at the beginning and the end of each accounting period.

5.4.2.2. For the calculation of changes in inventories at current and previous year prices, the assumption is made that inventory is valued using the FIFO costing method, or method that closely approximates to it (according to the Lithuanian law of bookkeeping).

5.4.2.3. Changes in inventories are divided into two groups: attributed to output (work-in-progress, finished goods and goods for resale) and those attributed to intermediate consumption (raw materials) in the process of estimates.

5.4.2.4. The book values of inventories are used to estimate physical changes in the value of inventories and holding gains. The inventory book values are deflated to constant prices of the base year. Then results of changes in inventories at constant prices are inflated to current prices and previous year prices.

5.4.2.5. Holding gain/losses are calculated using information on changes in stocks derived from the mentioned sources combining them with a range of price indices, and suitable assumptions about stock-holding periods.

5.4.3. Acquisitions less disposals of valuables

5.4.3.1. The main data sources used for the assessment of valuables are foreign trade statistics and domestic industries statistics. More specifically, foreign trade data (collected by the Customs of the Republic of Lithuania as Intrastat and Extrastat information) on imports and exports and data from a statistical questionnaire on enterprises' production are used as a basis.

5.4.3.2 The commodity flow method is used to compile data on acquisitions less disposals of valuables.

5.4.3.3. PPI for 32.12 (NACE Rev. 2), IPI for 32.12 and total IPI are used to estimate the valuables by commodity groups at previous year prices.

5.5. Exports and imports

Estimation at current prices

5.5.1. The main data source for exports and imports is quarterly BoP data published by BoL.

5.5.2. Information on exports and imports of goods is based on Customs declarations, Intrastat declarations (UPS-01 and UPS-02) and VAT declarations, provided by the STI. Estimates for exports and imports of services are based on a survey carried out by SL. In addition, information from the Interdepartmental Tax Data Warehouse, quarterly MFI's reports, State Border Guard Service's data and several other sources are also used.

5.5.3. Certain specific adjustments to exports and imports of goods and services are harmonised between the BoP and LNA; this concerns the inclusion of smuggled goods and illegal services and exports and imports of FISIM.

5.5.4. PRODCOM data is used to reflect the exported processing services, unlike in the BoP data, which are based on foreign trade statistics. Therefore data on exports of services (as well as on total exports of goods and service) differ from the BoP data.

5.5.5. The geographical split of exports and imports of goods and services for EU/ Euro area is produced using BoP data.

Estimation at previous year prices

5.5.6. Total EPI and total IPI are used for the estimation of exports and imports of goods at previous year prices for the $t-1$, $t-2$ years. Quarterly estimates are benchmarked to annual data.

5.5.7. Annual exports and imports of goods at previous year prices for the year $t-3$ are estimated by products (CPA at two digit-level) using appropriate EPI's and IPI's for deflation of values at current prices. Information from the SUT is used for the distribution of exports and imports of goods by products. Imports of goods are adjusted by freight and insurance cost to move from CIF to FOB. Quarterly estimates are benchmarked to annual data.

5.5.8. Weighted average of price indices of exported and imported services (appropriate implicit deflators of output by production approach) adjusted by changes of exchange rate is used to estimate exports and imports of services at previous year prices. Information from the BoP on exports and imports of services is used for the weights.

Chapter 6. GDP components: the income approach

GDP by income approach is estimated at $t+2$ and $t+4$ months; the flash estimate is not produced. Estimates are available only at current prices. Unlike the production and expenditure approaches the income is not an independent approach; operating surplus and mixed income are derived as the residual item.

6.0. Estimate at $t + 2$ months

6.0.1. Second estimate is based on econometric methods similar to production approach and is published in approximately t+2 months after the end of the reference quarter. Compensation of employees D.1, W&S D.11, employer’s social contributions D.12 are broken down by A*10 and is published at current prices seasonally and calendar adjusted and unadjusted

6.0.2. Compensations of employees, taxes on production and imports and subsidies on production and imports are estimated using multiple regression, autoregressive (AR) and ARIMAX models as described in chapter 3.1.1. Sometimes subsidies on production and imports are available from direct data sources.

6.0.3. The main regressors of the models of income approach components are provided in table below.

Table 2. Regressors used for income approach

| | Aggregates | Regressors | Remarks |
|---|------------------------------------|---|--|
| 1 | Wages and salaries | Average monthly earnings; Average number of employees; Seasonal factors. | |
| 2 | Social contributions | Average monthly earnings; Average number of employees; Seasonal factors. | Social contributions are taken from report of SIFB. Econometric model is used if report is late. |
| 3 | Operating surplus and mixed income | Retail and wholesale trade indicators; Production indicators; Statistical data of the State Tax Inspectorate (value added tax); | |
| 4 | Consumption of fixed capital | Production indicators; Average number of employees; Investment in tangible fixed assets; Seasonal factors. | |

Estimate at t+4 months

6.0.4. Calculation of GDP by income approach consists of compilation of the same components and at the same breakdown as at t+2: compensation of employees, including two components (W&S and employers’ social contributions), taxes on production and imports, subsidies on production and imports and consumption of fixed capital. Gross operating surplus and the mixed income are estimated as a residual item.

6.0.5. The estimates of the components are mainly based on direct data sources, that is, sample surveys and administrative records. They are mainly the same as used for the estimates of GDP by production approach.

6.0.6. Taxes on production and imports and subsidies on production and imports at this stage are available from State budget and Municipalities budgeted.

6.1. Compensation of employees

6.1.1. Estimates are mainly based on direct data sources i.e., quarterly sample surveys and administrative records. The components published are seasonally and calendar adjusted and unadjusted.

6.1.2. Compensation of employees' and its components: W&S and employers social contributions are estimated and published by kind of activities (A10 NACE Rev. 2).

6.1.3. Wages and salaries (D.11) is estimated on the basis of direct quarterly data sources. The main of them are:

- 1) the quarterly statistical survey on main financial indicators of non-financial enterprises;
- 2) quarterly data on revenues and outlays in the state and municipal budgets from the MoF;
- 3) quarterly statistical survey on wages and salaries;

6.1.4. Employers' actual social contributions (D.121) are estimated on the basis of administrative data and statistical survey data. The main source used is Social Security Funds report. The later figure is allocated to industries using statistical survey on main financial indicators of non-financial enterprises (F-01) and administrative data from state and municipal budgets.

6.1.5. Employers' imputed social contribution (D.122) are included into estimates and measured indirectly.

6.2. Taxes less subsidies on production

6.2.1. Taxes on production and imports (D.2) Estimates are based on the administrative data sources, i.e. tax authorities, state and municipalities budgets. The information on national taxes and other revenue is provided by the MoF. Administrative data sources are on cash basis.

6.2.2. Taxes on products D.21 are time adjusted in order to be measured on accrual basis. One month time lag is used for accrual adjustment calculation.

6.2.3. Subsidies on products (D.31) The main data sources for estimation of D.31 are quarterly state and municipalities budgets reports and data on subsidies for agriculture from EU Funds which are obtained from the MoF. Data sources are available on cash basis.

6.2.4. Other subsidies on production (D.39) Main data sources for the calculation of subsidies are quarterly reports of state and municipalities budgets, provided by the MoF. Every quarter, adjustments are made to ensure the results are on an accrual basis.

6.3. Gross operating surplus & mixed income

6.3.1. Gross operating surplus and mixed income is a balancing item when compiling GDP by income approach. The component is published for the total economy seasonally and calendar adjusted and unadjusted.

Chapter 7. Population and employment

7.1. Population

7.1.1. Quarterly information for total population is based on data from the Population census and Register of population.

7.1.2. The base for balances of population in Lithuania is number of people obtained from national census (the last census was conducted in 1st of March 2011). The resident population is based on the computing the demographics events (births, deaths and migration), collected from the administrative data sources and adding this information to the population of the previous reference date.

7.1.3. The balance method for the period after census is used. The reference data of resident population estimates is the beginning of period. At the end of May of the following year the average number of population is published.

Table 3. Population in Lithuania, thousands persons

| | Population | | | |
|----------------------------|------------|---------|---------|---------|
| Quarters of the year | 2014Q1 | 2014Q2 | 2014Q3 | 2014Q4 |
| Population in quarters | 2943,47 | 2936,15 | 2931,61 | 2927,33 |
| Average population in 2014 | 2932,367 | | | |

7.2. Employment: persons

7.2.1. Quarterly data on employment are estimated in “national” and “domestic” concepts. Data on employment is based on the LFS.

7.2.2. The LFS explore the situation of the economic activity of population, i.e. the fact of being employed, unemployed, or economically inactive in the reference period. The survey covers all people at the age 16 years and more, living in the sampled dwellings. Data on employment from LFS have all elements of labour market according to the national concept, requested by the NA methodology, including people working in non-observed economy.

Data on employment is adjusted only by the number of conscripts (Information on conscripts is provided by Ministry of Defence).

7.2.3. Employment according to the “domestic concept” is obtained by adjusting data from Labour Force Survey with values of temporary workers abroad. This adjustment is applied for employees.

7.2.4. The full coherence between data in domestic and national concept is assured.

7.3. Employment: total hours worked

7.3.1. The hours worked are estimated on the basis of LFS data on actually worked hours per week for total employment, employees and self-employed according to the “national Concept”.

7.3.2. Only one specific adjustment in activity O is made for national accounts purposes; working hours of conscripted forces are included. This information is obtained from the administrative

source.

7.3.3. Total hours worked in domestic concept (**DC**) are obtained by subtracting from total hours worked in national concept the number of hours worked by temporary workers abroad.

7.3.4. The quarterly data on the number of hours worked for total employment are consistent to the annual data, i.e. data on the number of hours worked from four quarters sum up to annual data.

7.3.5. Data on the number of hours worked are published at t+2 months after the reference quarter, total and by the A10 aggregation level according ESA 2010, and are seasonally adjusted and non-adjusted.

Chapter 8. Flash estimates

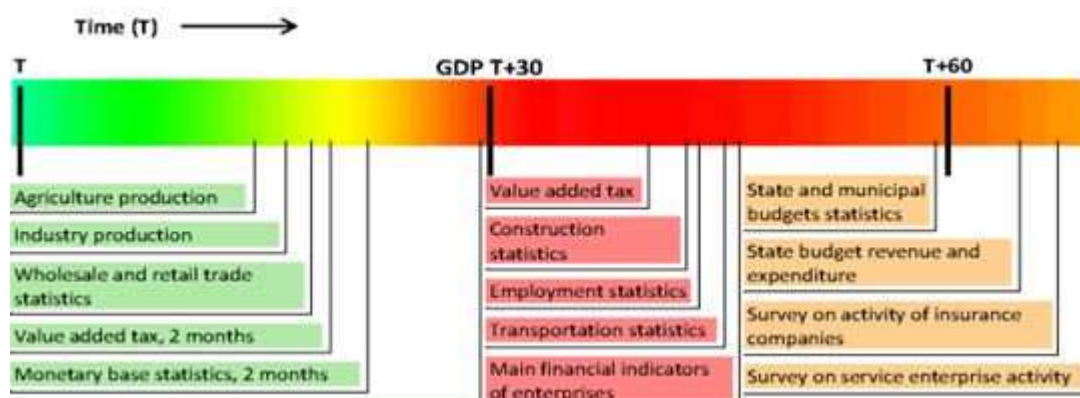
8.1. Flash GDP estimate

8.1.1. First release of provisional GDP (flash estimate) is issued on 30th day after the end of quarter. Only nominal, real and seasonally adjusted GDP and its growth rate are published at this time and also transmitted to Eurostat.

8.1.2. Econometric models with regression components are used to estimate the gross value added at current prices and chain-linked volumes by kind of activities (A10 NACE Rev. 2) seasonally and calendar adjusted and unadjusted. Value added is estimated using one of the models – multiple regression, autoregressive (AR) and ARIMAX.

8.1.3. Monthly or quarterly statistical data from surveys, registers or administrative sources is provided almost at the last days or later, when GDP t+30 should be announced (Picture 1).

Picture 1. Data availability for GDP t+30 estimates



As it could be seen above, the timeline of GDP t+30 is intensive; the necessary data is available between 20-26th days after corresponding quarter. Some monthly data is late; just two months of quarter are available (VAT, wholesale and retail trade statistics). It was evaluated, that just 40% of all necessary data for GDP preparation is accessible before 30 days after corresponding quarter. Last part – 60 % are missing – is extrapolated or now casted using mathematical, econometrical techniques.

8.1.4. The seasonally and calendar adjusted and unadjusted growth rates of quarterly GDP are estimated against the previous quarter and against the respective quarter of the previous year using chain-link volumes and published at t+30 days.

8.1.5. Statistical data for the reference quarter or the data for two corresponding months are available from Price Statistics, Construction and Investment Statistics, Industry Statistics, Foreign Trade Statistics, Domestic Trade Statistics, Transport and Service Statistics, Agriculture and Environment Statistics. Besides, the MoF, BoL, the STI provides the statistical data. If data for the last month is not available it is forecasted using the time series models.

8.2. Flash employment estimate

8.2.1. The flash employment estimate is published at t+45 days for total employed persons and working hours at A*10 level of NACE rev. 2. Data of employees and self employed are estimated using different time series models. Historical data of employment from year 1995 is used for the estimations. Total data of employment are aggregated from employees and self-employed data.

Chapter 9: Main data sources used

Chapter 9 provides information on statistical surveys and other data (administrative and fiscal data sources) used as a basis for the compilation of QNA in Lithuania. Many of the below listed and described data sources are used for compilation of GDP by three approaches; in some cases as the main source for estimates of the component while in other for verification purposes. The main data sources used broken down by approach of GDP calculations as well as for the employment are presented below.

9.1. GDP by production approach

9.1.1. The main source for the production approach is the quarterly statistical survey on main financial indicators of non-financial enterprises F-01

| |
|---|
| Name of the survey: <i>Main financial indicators of enterprises (quarterly F-01).</i> |
| Link to surveys undertaken at the European: Structural business statistics. |
| Periodicity: Quarterly |
| Time of availability of results: 75 th day after the end of the reference period. |
| Main variables used in QNA: Turnover; purchases of services; purchases of raw materials and supplies, fuels; stocks of inventories |
| Further adjustments made to the survey data: None. |

9.1.2. The **enterprise**, producing goods or rendering services, is the unit of the quarterly survey. The breakdown of enterprises by main economic activity is presented in conformity with “Statistical Classification of Economic Activities in European Community” (NACE Rev.2), excluding agricultural, hunting and related activities, financial intermediation, public administration and defence and private households with employed persons. Individual enterprises (sole-proprietorships) are out of scope of the survey.

9.1.3. The purposive cut-off sampling method is applied for the enterprises. Selected enterprises must represent the kind of economic activity by 2 digit level of NACE Rev.2 (except some cases by 3 and more digit level) and their income must make up more than 80 per cent of income in appropriate kind of activity.

9.1.4. The enterprises are selected according to their sales (turnover) and number of employees. All enterprises, which annual income in the base year were at least 10 per cent of total annual income of appropriate kind of activity or which average annual number of employees was more than 20 are taken into the quarterly survey. In those cases, when annual income of selected enterprises do not constitute 80 per cent of total income of appropriate kind of activity, small enterprises are involved in the sample.

9.1.5. Sampling and grossing-up is made taking into account turnover, number of employees and number of reported enterprises, and the collected information is expanded to those of operating enterprises using estimator extension coefficients.

Administrative data provided on quarterly basis:

9.1.6. Administrative data provided by the MoF. It includes information on the central and local government revenue and expenditure. It reflects the State and local budget revenue and expenditure by government function and economic classification.

9.1.7. Report on the budget execution of the State Social Insurance Fund. It presents information on its revenue and expenditure by type.

9.1.8. Report on the budget execution of the Compulsory Health Insurance Fund. It provides information on the revenue and expenditure by type.

9.1.9. Reports of the extra budgetary funds. There are five extrabudgetary funds, belonging to the central government sub-sector: the Guarantee Fund, the Savings Restitution Account, the Privatisation Fund, the Fund for Decommissioning of Ignalina Nuclear Power Plant, and the Reserve (Stabilisation) Fund. The extrabudgetary funds also provide information on their revenues and expenditures.

9.1.10. Report on the budget execution of the Unemployment Fund. It provides information on the revenue and expenditure by type.

9.1.11. Financial statements are used for public enterprises. Quarterly financial statements on the basis of PSAFRS from VSAKIS database of the MoF are used for public health care and public higher education institutions.

9.1.12. The sources of the primary data for the sector S.12 Financial corporations are the **financial statements of the Central Bank of Lithuania, Commercial Banks and Foreign Bank Branches Operating in Lithuania, Central Credit Union of Lithuania, Credit Unions, insurance companies, pension funds, financial brokerage and management companies** provided by the Central Bank of Lithuania every quarter. For other financial intermediaries these data are obtained from the comprehensive surveys carried out by SL.

9.1.13. The main source for the sector of non-profit institutions serving households S.15 is the annual survey on the economic and financial activity of membership organisations (political parties, trade unions and associations).

| |
|---|
| Name of the survey: <i>Statistical survey on non-profit institutions (F-16)</i> |
| Periodicity: Annual. |
| Time of availability of results: 9 th month after the end of the reference period. |
| Main variables used in QNA: compensation of employees, social security contributions, purchases of goods and services and etc. |
| Further adjustments made to the survey data: Statistical information is adjusted |

if revised data have been obtained.

9.2. GDP by expenditure approach

9.2.1 The main data sources used for the expenditure approach are different from those used by production approach; however for estimates of some specific components the same as for production can be used. Those are: quarterly survey of the main financial indicators of enterprises (F-01), surveys on financial activities, survey on service enterprise activity, reports for the estimates of data for the government sector and NPISHs.

9.2.2 Quarterly survey on service enterprises activity is one of the main data sources used for estimation of HFCE.

| |
|---|
| Name of survey: <i>Survey on service enterprise activity</i> |
| Link to surveys undertaken at the European level : short term business statistics |
| Periodicity: quarterly |
| Time of availability of results: 59th day after the end of the reference quarter |
| Main variables used in QNA: Sales income (turnover), i.e. income providing services received by an economic entity in the reporting period (VAT excluded). |
| Further adjustments made to the survey data: – |

9.2.3 Another important data source for the estimation of HFCE is monthly survey on trade and catering enterprises.

| |
|--|
| Name of survey: <i>Survey on trade and catering enterprises (PR-01)</i> |
| Link to surveys undertaken at the European level : short term business statistics |
| Periodicity: monthly |
| Time of availability of results: 28th day after the end of the reference month |
| Main variables used in QNA: Turnover, i.e. income gained by an economic entity from the sale of goods and/or provision of services (VAT excluded) over a certain period |
| Further adjustments made to the survey data: – |

9.2.4 Statistical survey on trade turnover at marketplaces is used for estimation of HFCE as well.

| |
|---|
| Name of survey: <i>Statistical survey on trade turnover at marketplaces (PR-02)</i> |
| Link to surveys undertaken at the European level : short term business statistics |
| Periodicity: Quarterly |
| Time of availability of results: 32nd day after the end of the reference quarter |
| Main variables used in QNA: Turnover, i.e. income received during a certain period through selling goods |
| Further adjustments made to the survey data: – |

9.2.5 Investment survey contains information on investment of fixed assets by the type of asset, investing institutional sector, economic activity. It is a basis for the estimates of GFCF.

| |
|---|
| Name of survey: <i>Investment survey (statistical investment questionnaire KS-02)</i> |
| Link to surveys undertaken at the European level : – |
| Periodicity: Quarterly |
| Time of availability of results: 55 th day after the end of the reference quarter |
| Main variables used in QNA: Investment in tangible and intangible fixed assets |
| Further adjustments made to the survey data: – |

9.2.6 Survey on construction enterprises activity is another data source used for estimation of GFCF.

| |
|---|
| Name of survey: <i>Survey on construction enterprises activity (KS-01)</i> |
| Link to surveys undertaken at the European level : short term business statistics |
| Periodicity: Quarterly |
| Time of availability of results: 45 th day after the end of the reference quarter |
| Main variables used in QNA: information on volume of construction works carried out |
| Further adjustments made to the survey data: – |

9.2.7 BoP statistics. Data on exports and imports of goods and services are estimated by the BoL.

9.2.8 Foreign trade statistics, compiled by SL, is an essential source for the compilation of exports and imports of goods statistics in BoP. From 2004, foreign trade statistics are produced based on the data from two statistical surveys – Intrastat and Extrastat. The target of these statistics – commodities entering and leaving the statistical territory of the Republic of Lithuania.

| |
|---|
| Name of survey: <i>INTRASTAT- EU system for compiling statistics of trade in goods with Member States</i> |
| Link to surveys undertaken at the European level : Intrastat Intra-EU trade |
| Periodicity: Monthly |
| Time of availability of results: 40 days after the end of the reference period |
| Main variables used in QNA: exports and imports of goods |
| Further adjustments made to the survey data: Foreign trade statistics data are adjusted in accordance with the methodological requirements for compiling of the BoP. |

| |
|---|
| Name of survey: <i>EXTRASTAT- EU system for compiling statistics of trade in goods with non-Member States</i> |
| Link to surveys undertaken at the European level : Extrastat Extra-EU trade |
| Periodicity: Monthly |
| Time of availability of results: 40 days after the end of the reference period |
| Main variables used in QNA: exports and imports of goods |
| Further adjustments made to the survey data: Foreign trade statistics data are adjusted in accordance with the methodological requirements for compiling of the BoP. |

9.3. GDP by income approach

9.3.1. The main data sources used for the income approach are quarterly statistical survey on main financial indicators of non-financial enterprises F-01, report on State budget revenue, report on municipal budget revenue and expenditure, report on the State Social Insurance Fund's revenue. They are the same as used for the production approach and are described in Section 9.1.

9.4. Employment data

9.4.1. The main data source used for employment data estimates is LFS.

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| Name of the survey: <i>Labour Force Survey (GU-01)</i> . |
| Link to surveys undertaken at the European level: Commission Regulation (EC) No 377/2008 of 25 April 2008 implementing Council Regulation (EC) No 577/98 on the organisation of a labour force sample survey in the Community as regards the codification to be used for data transmission from 2009 onwards, the use of a sub-sample for the collection of data on structural variables and the definition of the reference quarters (OJ 2008 L 114, p. 57) last amended by European Commission Regulation (EC) No 317/2013 of 8 April 2013 (OJ 2013 L 99, p. 1). |
| Periodicity: Quarterly |
| Time of availability of results: Results are published by quarter. The information is published 48 days after the end of the reference period. |
| Main variables used in QNA: employment data, hours worked |
| Further adjustments made to the survey data: adjustments made for conscripts |

Annexes

Annex 1. The list of regressors groups used for production approach

| | NACE rev.2 | Regressors groups | Mathematical models |
|---|--|--|---|
| 1 | A. Agriculture, forestry and fishing | Gross agricultural production Volume index of agriculture production Average number of employees Statistical data of the State Tax Inspectorate (value added tax) Seasonal factors | Multiple regression and ARIMAX models are used. |
| 2 | B. Mining and quarrying | Industrial production Statistical data of the State Tax Inspectorate (value added tax) Seasonal factors | Multiple regression models are used. |
| 3 | C. Manufacturing | Industrial production Statistical data of the State Tax Inspectorate (value added tax) Number of enterprises Number of employees in full time unit Extrastat and Intrastat information Seasonal factors | Multiple regression models are used. |
| 4 | D. Electricity, gas, steam and air conditioning supply | Industrial production Statistical data of the State Tax Inspectorate (value added tax) Seasonal factors | Multiple regression models are used |
| 5 | E. Water supply; sewerage, waste management and remediation activities | Industrial production Statistical data of the State Tax Inspectorate (value added tax) Seasonal factors | Multiple regression models are used. |

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| 6 | F. Construction | <p>Construction work carried out</p> <p>Number of granted permits for residential and non-residential buildings (lagged)</p> <p>Statistical data of the State Tax Inspectorate (value added tax)</p> <p>Seasonal factors</p> | Multiple regression models are used. |
| 7 | G. Wholesale and retail trade, repair of motor vehicles and motorcycles | <p>Turnover of retail and wholesale trade</p> <p>Statistical data of the State Tax Inspectorate (value added tax)</p> <p>Seasonal factors</p> | Multiple regression models are used. |
| 8 | H. Transportation and storage | <p>Goods and passenger transportation and turnover</p> <p>Statistical data of the State Tax Inspectorate (value added tax)</p> <p>Sales income of enterprises</p> <p>Seasonal factors</p> | Multiple regression models are used. |
| 9 | I. Accommodation and food service activities | <p>Turnover of catering enterprises</p> <p>Accommodated tourists in accommodation enterprises</p> <p>Statistical data of the State Tax Inspectorate (value added tax)</p> <p>Seasonal factors</p> | Multiple regression models are used. |
| 10 | J. Information and communication | <p>Sales income of enterprises</p> <p>Statistical data of the State Tax Inspectorate (value added tax)</p> <p>Seasonal factors</p> | Multiple regression models and ARIMAX are used. |
| 11 | K. Financial and insurance activities | <p>Sales income of enterprises</p> <p>Statistical data of the State Tax Inspectorate (value added tax)</p> <p>Indicators from Monetary financial institutions balance, Bank of Lithuania</p> <p>Monetary financial institutions</p> | Multiple regression models and ARIMAX are used. |

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| | | interest rates, Bank of Lithuania Seasonal factors | |
| 12 | L. Real estate activities | Sales income of enterprises Statistical data of the State Tax Inspectorate (value added tax) Seasonal factors | Multiple regression models and ARIMAX are used. |
| 13 | M. Professional, scientific and technical activities | Sales income of enterprises Statistical data of the State Tax Inspectorate (value added tax) Seasonal factors | Multiple regression models and ARIMAX are used. |
| 14 | N. Administrative and support service activities | Sales income of enterprises Statistical data of the State Tax Inspectorate (value added tax) Seasonal factors | Multiple regression models and ARIMAX are used. |
| 15 | O. Public administration and defence; compulsory social security | Data on the state budget execution, MoF Statistical data of the State Tax Inspectorate (value added tax) Seasonal factors | Multiple regression models and ARIMAX are used. |
| 16 | P. Education | Sales income of enterprises Statistical data of the State Tax Inspectorate (value added tax) Seasonal factors | Multiple regression models are used. |
| 17 | Q. Human health and social work activities | State budget expenditures for health and social work Sales income of enterprises Seasonal factors | Multiple regression models are used. |
| 18 | R. Arts, entertainment and recreation | Sales income of enterprises Statistical data of the State Tax Inspectorate (value added tax) Seasonal factors | Multiple regression models are used. |
| 19 | S. Other service activities | Sales income of enterprises; Statistical data of the State Tax | Multiple regression models and ARIMAX are used. |

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| | | Inspectorate (value added tax) Seasonal factors | |
| 20 | T. Activities of households as employers; undifferentiated goods - and services-producing activities of households for own use | Seasonal factors | Autoregressive AR(1) model is used. |