

**9th Meeting of the Advisory Expert Group on National Accounts,
8-10 September 2014, Washington DC**

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Backcasting – Brazil

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THE BACKCASTING OF BRAZIL'S NATIONAL ACCOUNTS

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The backcasting of Brazil's National Accounts

1 - Introduction

In Brazil, supply and use tables for 2010 are being produced according to the 2008's revision of the System of National Accounts and to the international classification of economic activities' 4th revision (ISIC 4).

To preserve data comparability through time, 2000-2009 tables must be reconstructed, incorporating classification and definition changes adopted for 2010.

A backcasting process will be applied for the entire SUTs, for the 2000-2009 period. For the 1995-1999 period, backcasting will cover only value added series (aggregated in 12 activities), final uses, imports and taxes on products.

Backcasting will be applied to annual data and, after that, quarterly series will be adjusted to the new annual totals in a benchmarking process (Denton).

New supply and use tables for the period from 2000 (current values) to 2010 (at 2009's prices) will be produced. Backcasted value added series for 12 activities will be released for the 1995 – 2010 period.

2 – Classification and special cases

The first step in the backcasting process is the classification adjustment.

In this step, a correspondence spreadsheet is created to adjust the 2000-2009 data to the 2010 classifications (ISIC 4). SUT's for 2010 are aggregated to 56 activities and 110 products and new 2000-2009 tables at this aggregation level are created from the more disaggregated original data (adopting most of ISIC's 4th revision).

Besides making classifications uniform and allowing the construction of aggregated SUT's, this correspondence spreadsheets put aside data for four activities and five products that went through significant changes (of classification or treatment in the SNA) and are separately backcasted. Later, their backcasted lines and columns are added to the backcasted SUTs. The four activities are:

- *Books, newspapers and magazines' editing* – With the new ISIC classification, books, newspapers and magazines became products of the *Editing* activity (a service) and not graphic products (industrial ones) as in the previous ISIC.
- *Machinery and equipment repairs and maintenance* – In ISIC 3, these services were part of machinery and equipment production activities. In ISIC 4, they became a specific activity, in the industrial sector.
- *Research and development* – Classified as gross fixed capital formation in SNA 2008, *Research and development* was recalculated for the entire 2000-2009 series, in a partnership project with the Science, technology and innovation ministry.
- *Software licensing and development* – Also classified as gross fixed capital formation, the activity is estimated with more detail for the new series.

The five products backcasted separately are:

- Books, newspapers and magazines
- Machinery and equipment repairs and maintenance
- Private research and development
- Public research and development (in the Public administration activity)
- Software licensing and development

3 – Backcasting

3.1 – Process overview

The backcasting of the Brazilian national accounts is divided in six steps:

1 – Backcasting, for 2009, of the four activities and five products treated apart (section two, above) starting with 2010's current values and going through 2010's values at 2009's prices'.

2 – Backcasting of the other activities from 2010 to 2009.

3 – Backcasting of the detached products and activities from 2009 to 2000.

4 – Backcasting of the remaining activities from 2009 to 2000.

5 – Sum of the backcasted tables. Activities and products treated separately are added to activities and products already in the 56 activities and 110 products' SUT. For example: *Books, newspapers and magazines' editing* will be added to the *Information services'* activity.

In this step, summary tables are created in order to evaluate the backcasted macroeconomic aggregates' evolution and consistency.

6 – Chaining of the aggregated series (for 12 aggregated activities). For the period from 2000 (at 1999's prices) to 1995, the SUT's are not backcasted: only the chained series are, starting with the values at the new, backcasted, 2000 SUT.

The 2010-2009 backcasting (steps 1 and 2) has to be done separately because there are no annual data for 2010 in the ISIC 3/SNA93 base. The only comparable tables for the 2009-2010 period are the quarterly national accounts' SUTs. These tables are built with the same aggregation level used in the release of annual data (56 activities and 110 products). Their main deficiency regarding the annual data is not to include SUT's generation of income accounts – with salaries, social contributions, other taxes on production and occupations.

These variations of income and occupations are calculated apart and applied to the 2010 totals in order to backcast them to 2009.

With the exception of this adjustment, the backcasting process used from 2009 to 2000 has the same mechanic used in the 2010-2009 period. The next section, then, describes the backcasting as applied to both periods.

3.2 Price and volume indexes

SUT's backcasting is made through the price and volume indexes implicit in the SUTs adjusted for the new classification (ISIC 4).

These indexes are applied to the 2010 data, backcasting them to 2000.

To the products and activities treated apart (highlighted in the previous sections) specific volume and price indexes are used (the same used in Brazil's national accounts from 2010 on, after the system's revision).

3.3 – Taxes

Some definitions in the 2008 manual led to the reclassification of taxes in the supply and use tables.

Transaction costs associated to real estate sales became part of gross fixed capital formation. So, the tax on real estate transfer (ITBI for its Portuguese acronym) is no longer considered as a tax on capital and became a tax on products (on the *Construction* product).

With that, the total amount of taxes on products (originally preserved in the backcasting process) is added with ITBI's total. Volume and price variations for the *Construction* cell at SUT's Other taxes on products column are calculated from ITBI's total and the cell's original value.

Also, the Social integration program (PIS, in Portuguese), a tax that previously had a different base, is now mainly charged on the enterprises' sales receipts. In the backcasting process, PIS is relocated to be treated as a tax on products (and not anymore as a social contribution).

3.4 – Trade and transport margins

To keep SUT's internal coherence, trade and transport margins totals have to be recalculated to account for the backcasted values for production, imports, intermediate consumption and final uses of trade and cargo transport.

New margin totals are distributed by product according to the margin structures (backcasted using the margins' volumes and prices).

3.5 – Social benefits and other taxes on production

Social benefits, as well as Other taxes on production, are backcasted with value indexes, given that their block, at the SUT, is calculated only at current prices.

After applying the value indexes for the 56 activities, the original totals for taxes and social contributions (the totals for all activities) are reinstated. This is done in a *pro rata* adjustment to the backcasted structure. This allows, at the same time, for the structure's adjustment and the total's preservation.

In backcasting, the value of the Social integration program (PIS) is subtracted from the social contributions' total (section 3.3).

3.6 – The SUT’s balance

After applying volumes and prices to the different blocks of the 2010 SUT, the result are unbalanced SUTs for the backcasted years.

Backcasted SUT’s must be rebalanced, so that, calculated by its three approaches, GDP is the same.

The balance shall be obtained by adjusting the uses, since data for production are considered of the highest quality amongst national accounts’ sources and are mostly preserved in the original annual SUT calculation.

The balance has to be obtained product by product according to its specific uses and to the imbalance’s magnitude.

In the cases in which part of the difference between supply and demand is added to the intermediate consumption, the balancing total is distributed proportionally between the activities that use the product (*pro rata*).

This automatic criterion has to be reviewed by each activity’s analysts in order to prevent distortions in the value added level or growth.

After that, intermediate consumption totals are determined and the value added is obtained as the balancing item for the 56 activities in the SUTs.

The sum of gross operating surplus and mixed income is obtained by subtracting remunerations (backcasted salaries and social contributions) and other taxes on production from the value added.

4 – 2000-1995 series and quarterly series’ adjustment

The backcasted value added for 2000 is aggregated in 12 activities to be the starting point for the chaining of volumes and prices that will lead to the new series for 2000- 1995. The volume and price data used are derived from the current annual data for these activities’ value added.

Quarterly series are adjusted to new annual totals with the Denton method – that minimizes the difference between successive adjustments in the series as it changes quarterly values to adjust them to new annual totals. Quarterly profiles will be adjusted in the cases in which there is information available.

5 – Concluding remarks

The backcasting of the Brazilian national accounts data and the adjustment to the latest classification (ISIC 4) and definitions (SNA 2008) is based, mainly, on the existing SUTs.

After adjusting the SUTs for classification changes, implicit volume and price indexes are calculated. These indexes are used to backcast 2010 totals, producing new SUTs for the 2009-2000 period.

Specific adjustments are made to preserve totals like the government tax revenue and social contributions as well as to keep coherence between trade and transport margins and trade and transport production and uses.

SUT's equilibrium is made through balancing, by adjusting the demand for products and the gross operating surpluses to the new backcasted values for the supply of goods and services.