# Extracting GDP signals from the monthly indicator of economic activity Evidence from a real-time database*

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## Abstract

With data from a newly constructed real-time database it is analyzed what information the monthly indicator of Chilean economic activity (*IMACEC*) contains about the "true" GDP, i.e. the GDP value which is no longer subject to revisions. The database is presented and the revisions analyzed. It is argued that when three months of *IMACEC* data are available, it is possible to extract signals about the "true" GDP, which are as reliable as those contained in the first release of the GDP.

It is then investigated how much extra information *IMACEC* data provide of the "true" GDP compared to the information already present in historical data. Measured by the root mean square error (*RMSE*), the first *IMACEC* data of the quarter improves the nowcast performance with 55%. Another month of data improves the performance with another 26% and data for the last month of the quarter improves the performance with an additional 7%.

**Keywords:** Real time data, data revisions, Nowcasting.

**JEL classifications:** C89, E17.

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## 1. Introduction

For the conduction of monetary policy, timely and reliable information is of great importance. Since many macroeconomic data are subject to revisions, information about the reliability is particularly relevant in order to evaluate the actual content of a given data. In the case of Chile, the Council of the Central Bank meets every month, usually after the publication of the monthly indicator of economic activity (*IMACEC*[1]). To be able to investigate what signals this indicator gives about the "true" Gross Domestic Product (GDP), when data is no longer revised, a macroeconomic real-time database is under construction. This database currently contains information about revisions in the *IMACEC* and in the quarterly GDP. When it is completed, the database will also include observations of the GDP components on the supply as well as the demand side.

The present paper presents some first results using data from this database. In particular it is analyzed what information the monthly published *IMACEC* contains about the quarterly published GDP. The results show that with respect to the "true" GDP growth rates, signals which are as reliable as those of the first GDP publication (released three weeks later) can be extracted from the *IMACEC*. Furthermore, compared to nowcasting the "true" GDP with historical data, adding information of the *IMACEC* for the first month of quarter improves the performance with 55%. When the indicator for the second month of the quarter is published, the nowcasting performance improves with another 26% and with an additional 7% when the last *IMACEC* of the quarter is known.

Research on real-time data has been going on for quite a while and by now several real-time databases have been constructed; among these some are available for external users.[2] Along with the creation of these databases, the related literature has been growing rapidly and a recent review can be found in Croushore (2008). According to Croushore the existing research on real-time data can be divided into five areas: analysis of data revisions; implications for forecasting; analysis of monetary policy;

[1] For its Spanish abbreviation: Indicador mensual de actividad ecomomica.

[2] These include an US real-time database (Croushore and Stark, (2001, 2003)); one from the UK (Castle and Ellis, 2002); and one from New Zealand (Sleeman, 2006).

macroeconomic research; and analysis of business and financial conditions. The analysis in this paper falls within the first two categories, though strictly speaking the issue investigated is nowcasting rather than forecasting.

The rest of the paper is organized as follows. The next section describes the data used in the analysis including a description of the real-time database. Section 3 analyzes the revisions made in *IMACEC* and GDP data, while section 4 investigates how to extract useful GDP signals from *IMACEC* data. The last section concludes and offers some guidelines for future research using real-time data for Chilean economic activity.

## 2. Description of data

The *IMACEC* has been published since 1987; the first publication included six years of data.[3] Since then two mayor revisions have taken place, both coincided with changes in the base year.[4] As the name indicates, *IMACEC* is an indicator of the activity; in fact it is classified as a synthetic indicator with an accounting approach.[5] It has proven to be an important tool in the measurement of the evolution of the Chilean economy in the short-run.

Even though it is an indicator, its resemblance with the GDP is unquestionable. For example, GDP publications and revisions are accompanied with revisions in the monthly indicator, though these revisions cannot be related to specific expenditure groups as the *IMACEC* is only published in aggregate form.

In the following analysis, data from 1986 to 2007 are applied, i.e. data up till the first publication of the GDP of the fourth quarter 2007. During this period Chile has arguably experienced seven growth cycles[6] with rates fluctuating between -6.0% and 14.6% with an average of 5.0% (see figure 1).

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[3] See Venegas (1987).

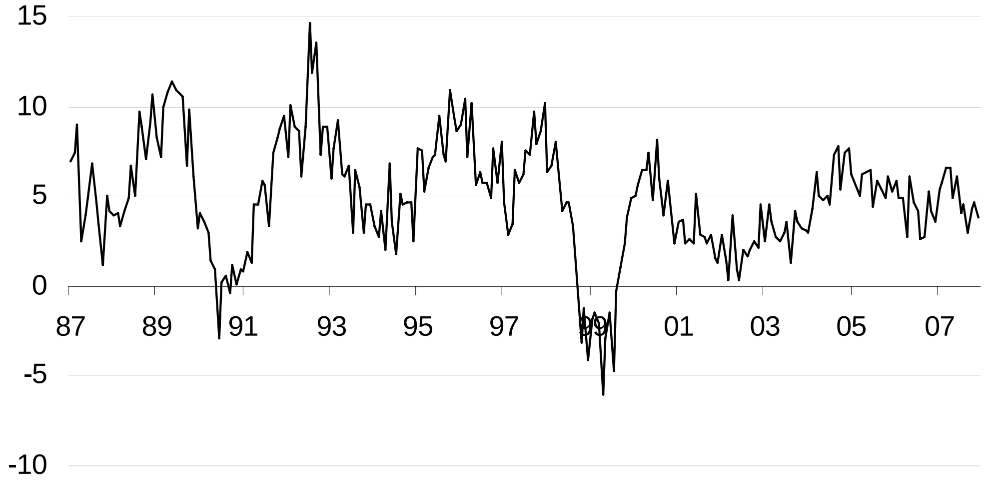
[4] Changes in the GDP base year are documented in Correa et al. (2002) and Stanger (2007).

[5] See Escandón et al. (2005).

[6] See Pedersen (2008).

**Figure 1. Annual growth rates, first publications of *IMACEC***

**(**percentage)




Source: Central Bank of Chile.

## *2.1 The real-time database*

As mentioned in the introduction, the construction of the real-time database for the Chilean activity is still work in progress. The part of the database used in the present analysis consists of the data of *IMACEC* and GDP published since 1986. The sources are "Informe Economico y Financiero" and "Avance Estadístico del Boletín Mensual", both published by the Central Bank of Chile; the former twice a month until March 2001, where it was replaced by the latter, which is a monthly publication. *IMACEC* is published with a delay of approximately five weeks, while the delay for the GDP is around eight weeks. Hence, *IMACEC* data for a given quarter are usually available three weeks before the first publication of the GDP.

## Table 1. A section of the real-time *IMACEC* database

(constant prices, index)

| | 2006 | | | | | | | | | | 2007 | | | | | | | | | | | | 2008 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **Mar.** | **Apr.** | **May** | **Jun.** | **Jul.** | **Aug.** | **Sep.** | **Oct.** | **Nov.** | **Dec.** | **Jan.** | **Feb.** | **Mar.** | **Apr.** | **May** | **Jun.** | **Jul.** | **Aug.** | **Sep.** | **Oct.** | **Nov.** | **Dec.** | **Jan.** | **Feb.** | **Mar.** |
| 1/06 | 147.7 | 147.7 | 147.2 | 147.2 | 147.2 | 147.1 | 147.1 | 147.1 | 147.0 | 147.0 | 147.0 | 147.0 | 114.5 | 114.5 | 114.5 | 114.5 | 114.5 | 114.5 | 114.5 | 114.5 | 114.5 | 114.5 | 114.5 | 114.5 | 112.2 |
| 2/06 | | 136.9 | 136.8 | 136.8 | 136.8 | 137.3 | 137.3 | 137.3 | 137.1 | 137.1 | 137.1 | 137.1 | 107.0 | 107.0 | 107.0 | 107.0 | 107.0 | 107.0 | 107.0 | 107.0 | 107.0 | 107.0 | 107.0 | 107.0 | 106.5 |
| 3/06 | | | 156.5 | 156.5 | 156.5 | 157.0 | 157.0 | 157.0 | 156.9 | 156.9 | 156.9 | 156.9 | 124.9 | 124.9 | 124.9 | 124.9 | 124.9 | 124.9 | 124.9 | 124.9 | 124.9 | 124.9 | 124.9 | 124.9 | 125.4 |
| 4/06 | | | | 147.9 | 147.9 | 147.8 | 147.8 | 147.8 | 147.8 | 147.8 | 147.8 | 147.8 | 118.0 | 118.0 | 118.0 | 118.0 | 118.0 | 118.0 | 118.0 | 118.0 | 118.0 | 118.0 | 118.0 | 118.0 | 119.9 |
| 5/06 | | | | | 153.0 | 153.2 | 153.2 | 153.2 | 153.1 | 153.1 | 153.1 | 153.1 | 121.7 | 121.7 | 121.7 | 121.7 | 121.7 | 121.7 | 121.7 | 121.7 | 121.7 | 121.7 | 121.7 | 121.7 | 122.2 |
| 6/06 | | | | | | 147.3 | 147.3 | 147.3 | 146.9 | 146.9 | 146.9 | 146.9 | 115.2 | 115.2 | 115.2 | 115.2 | 115.2 | 115.2 | 115.2 | 115.2 | 115.2 | 115.2 | 115.2 | 115.2 | 114.1 |
| 7/06 | | | | | | | 142.4 | 142.4 | 141.6 | 141.6 | 141.6 | 141.6 | 113.5 | 113.5 | 113.5 | 113.5 | 113.5 | 113.5 | 113.5 | 113.5 | 113.5 | 113.5 | 113.5 | 113.5 | 114.6 |
| 8/06 | | | | | | | | 142.6 | 142.3 | 142.3 | 142.3 | 142.3 | 113.5 | 113.5 | 113.5 | 113.5 | 113.5 | 113.5 | 113.5 | 113.5 | 113.5 | 113.5 | 113.5 | 113.5 | 113.8 |
| 9/06 | | | | | | | | | 142.2 | 142.2 | 142.2 | 142.2 | 112.2 | 112.2 | 112.2 | 112.2 | 112.2 | 112.2 | 112.2 | 112.2 | 112.2 | 112.2 | 112.2 | 112.2 | 112.6 |
| 10/06 | | | | | | | | | | 150.2 | 150.2 | 150.2 | 118.3 | 118.3 | 118.3 | 118.3 | 118.3 | 118.3 | 118.3 | 118.3 | 118.3 | 118.3 | 118.3 | 118.3 | 118.5 |
| 11/06 | | | | | | | | | | | 148.3 | 148.3 | 117.0 | 117.0 | 117.0 | 117.0 | 117.0 | 117.0 | 117.0 | 117.0 | 117.0 | 117.0 | 117.0 | 117.0 | 117.7 |
| 12/06 | | | | | | | | | | | | 155.4 | 122.0 | 122.0 | 122.0 | 122.0 | 122.0 | 122.0 | 122.0 | 122.0 | 122.0 | 122.0 | 122.0 | 122.0 | 124.0 |
| 1/07 | | | | | | | | | | | | | 120.6 | 120.6 | 120.7 | 120.7 | 120.7 | 120.7 | 120.7 | 120.7 | 120.8 | 120.8 | 120.8 | 120.8 | 118.7 |
| 2/07 | | | | | | | | | | | | | | 113.1 | 112.7 | 112.7 | 112.7 | 112.6 | 112.6 | 112.6 | 112.8 | 112.8 | 112.8 | 112.8 | 112.6 |
| 3/07 | | | | | | | | | | | | | | | 133.2 | 133.2 | 133.2 | 133.1 | 133.1 | 133.1 | 133.1 | 133.1 | 133.1 | 133.1 | 134.1 |
| 4/07 | | | | | | | | | | | | | | | | 125.8 | 125.8 | 126.2 | 126.2 | 126.2 | 126.3 | 126.3 | 126.3 | 126.3 | 128.6 |
| 5/07 | | | | | | | | | | | | | | | | | 127.6 | 127.9 | 127.9 | 127.9 | 128.1 | 128.1 | 128.1 | 128.1 | 128.6 |
| 6/07 | | | | | | | | | | | | | | | | | | 122.3 | 122.3 | 122.3 | 122.6 | 122.6 | 122.6 | 122.6 | 121.2 |
| 7/07 | | | | | | | | | | | | | | | | | | | 118.1 | 118.1 | 118.9 | 118.9 | 118.9 | 118.9 | 119.9 |
| 8/07 | | | | | | | | | | | | | | | | | | | | 118.6 | 118.7 | 118.7 | 118.7 | 118.7 | 118.8 |
| 9/07 | | | | | | | | | | | | | | | | | | | | | 115.6 | 115.6 | 115.6 | 115.6 | 115.7 |
| 10/07 | | | | | | | | | | | | | | | | | | | | | | 123.4 | 123.4 | 123.4 | 123.5 |
| 11/07 | | | | | | | | | | | | | | | | | | | | | | | 122.4 | 122.4 | 122.9 |
| 12/07 | | | | | | | | | | | | | | | | | | | | | | | | 126.6 | 128.2 |

Source: Central Bank of Chile.

Note: The rows contain the published data of the month indicated in the first column. The data were published in the issue of “Avance Estadístico del Boletín Mensual” indicated in the first row. Marked numbers indicate that the data has been revised. Until February 2006 the base year is 1996 and from March 2007 it is 2003.

The real-time database includes all the observations published in a given issue such that it is possible to follow all historical revisions in a given time series. Examples from the *IMACEC* and the GDP real-time databases are reported in tables 1 and 2. The current policy of revisions implies that current year *IMACEC* data are revised every quarter in order to match the published GDP-data. Once a year, in March when annual accounts are published, a major revision of historical data takes place. In March 2007 the GDP base year was changed from 1986 to 2003. At the same time the *IMACEC* was re-based to index 2003 = 100. In the next section the revisions of the two series are analyzed in greater details.

**Table 2. A section of the real-time GDP database**

(constant prices, million pesos)

| | 2006 | | | 2007 | | | | 2008 |
|---|---|---|---|---|---|---|---|---|
| | **May** | **Ago.** | **Nov.** | **Mar.** | **May** | **Ago.** | **Nov.** | **Mar.** |
| I/06 | 11.464.700 | 11.488.754 | 11.478.428 | 14.767.446 | 14.767.446 | 14.767.446 | 14.767.446 | 14.668.483 |
| II/06 | | 11.668.947 | 11.657.484 | 15.128.813 | 15.128.813 | 15.128.813 | 15.128.813 | 15.189.667 |
| III/06 | | | 11.092.285 | 14.462.037 | 14.462.037 | 14.462.037 | 14.462.037 | 14.537.983 |
| IV/06 | | | | 15.230.521 | 15.230.521 | 15.230.521 | 15.230.521 | 15.352.820 |
| I/07 | | | | | 15.629.265 | 15.617.348 | 15.634.239 | 15.580.886 |
| II/07 | | | | | | 16.045.098 | 16.071.464 | 16.130.990 |
| III/07 | | | | | | | 15.057.612 | 15.110.208 |
| IV/07 | | | | | | | | 15.971.384 |

Source: Central Bank of Chile.

Note: The rows contain the published data of the quarter indicated in the first column. The data were published in the issue of “Avance Estadístico del Boletín Mensual” indicated in the first row. Marked numbers indicate that the data has been revised. The data published in 2006 are in constant 1986-prices; while those published since March 2007 are in 2003-prices.

## 3. Revisions of *IMACEC* and GDP

Two aspects of the revisions are analyzed in this section: revisions in *IMACEC* made with the publications of the GDP and revisions in the GDP between the first and the last publication. Usually data more than five years old are no longer subject to revisions.

Growth rates are calculated with levels published at the same point in time. Hence, the growth rate at time $t$ for the quarterly GDP, $x_t$, is calculated as

$$\Delta^4 x_{t,\tau} = 100 * \left( \frac{x_{t,\tau}}{x_{t-4,\tau}} - 1 \right), \tag{1}$$

where $x_{t,\tau}$ is the level of the series at time $t$ published at time $\tau$. With respect to the *IMACEC*, $y_t$, the annual growth rate for the quarter $t$ is calculated as

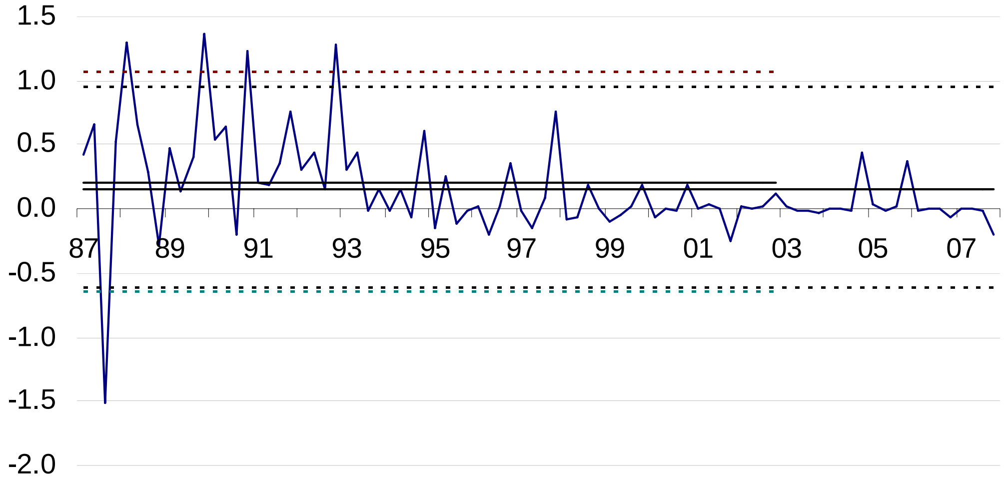
$$\Delta^4 y_{t,\tau} = 100 * \left( \frac{\frac{1}{3}\sum_{i=1}^{3} y_{t_i,\tau}}{\frac{1}{3}\sum_{i=1}^{3} y_{t_i-12,\tau}} - 1 \right), \tag{2}$$

where $t_i$ ($i$ = 1,2,3) indicates the $i$'th month of the $t$'th quarter. Figure 2 shows the revisions of the growth rates made between the publication of the last *IMACEC* of the quarter and the first publication of the GDP for the same quarter. Note that last five years of observations may be changed due to further revisions, while observations before 2003 supposedly will remain unchanged.

Due to methodology improvements, the revisions in the last part of the period are substantially smaller than the early ones. Of the 84 revisions shown in figure 2, 60% were positive. The revisions do not seem to be systematic in the sense that 50% of the revisions have the same sign as the one of the period before, i.e. in half of the cases a positive (negative) revision is followed by another positive (negative) one. In an estimated AR(1) model the coefficient of the lagged revision is not significantly different from zero when standard confidence levels are applied.

**Figure 2. Revisions made between the first publications of *IMACEC* and GDP**

(percentage points)




Source: Own calculations.

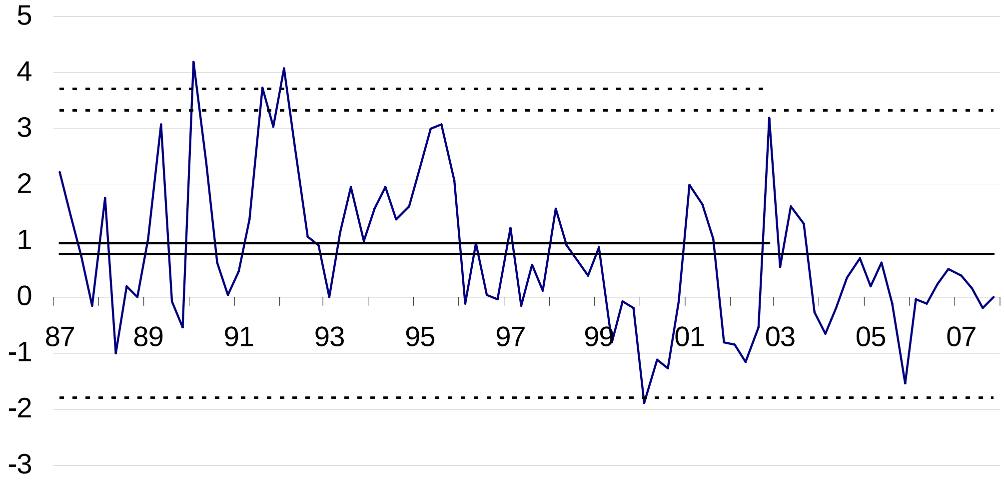
Note: Solid straight lines indicate averages and the dotted lines are the averages plus / minus two times the standard deviation.

With respect to GDP, figure 3 shows revisions made between the first and the last publication. As in the case of the *IMACEC*, the revisions are generally smaller in the later part of the period. On the other hand, the GDP revisions seem to have been affected by some kind of systematic behavior; approximately 70% of the revisions have been positive and almost three out of four have the same sign as the previous one. Furthermore, an estimation of an AR(1) model indicates that the coefficient of the lagged revision is significantly positive supporting the presence of systematic behavior in the revisions of the Chilean GDP.

In the next section it is investigated what GDP signals can be extracted from monthly *IMACEC* data.

**Figure 3. GDP revisions: last minus first publication**

(percentage points)




Source: Own calculations.

Note: Solid straight lines indicate averages and the dotted lines are averages plus / minus two times the standard deviation.

## 4. GDP nowcasting using monthly *IMACEC* data

Since *IMACEC* data for a given quarter is available before the corresponding GDP data, a natural question is if this first GDP release contains extra information about the "true" value, i.e. the data which is no longer revised. In the next subsection this issue is analyzed and subsection 4.2 is dedicated to the analysis of how much extra information *IMACEC* data can provide about the "true" GDP compared to the information already contained in historical data. In order to focus the analysis on final ("true") data, only annual growth rates for the period 1987 – 2002 are utilized in this section.

## 4.1 Comparing signals in the IMACEC and the first release of the GDP

To compare signals extracted from the *IMACEC* about the "true" GDP data with those of first release data, two models are estimated: one using first release growth rates to explain variation in final GDP and another one adding *IMACEC* growth rates as explanatory variable. The information criteria Akaike and Schwarz have been used to select the lag length. The first model estimated is:

$$\Delta^4 x_t^f = \underset{(0.04)}{1.15} \Delta^4 x_t^1 + \varepsilon_t, \quad \varepsilon_t = \underset{(0.12)}{0.48} \mu_{t-1} + \mu_t. \tag{3}$$

$$R^2 = 0.91, \quad \overline{R^2} = 0.91, \quad RMSE = 0.97,$$

where $\Delta^4 x^f$ is the annual growth rate of the final GDP and $\Delta^4 x^1$ is the annual growth rate of the fist publication of the GDP, both calculated according to (1). The term $\varepsilon$ is an error term, which is described by a moving average (MA) model and $\mu$ indicates *iid* errors. Numbers in parenthesis are standard deviations and *RMSE* is the root mean square error calculated with in-sample nowcasts.

The model (3) does not include any lags of the first release data and the residuals have been modeled as an MA(1). The coefficient of the first release data is significantly larger than one in accordance with the fact that the majority of the revisions have been positive, as reported earlier. The $R^2$ coefficient indicates that more than 90% of the variation in the final growth rates can be explained by this model. With respect to (in-sample) nowcasting, the *RMSE* of 0.97 could be compared to the nowcast using simply the first release growth; the latter has a *RMSE* of 1.27 and thus is "beaten" by the model (3).

The model including *IMACEC* data as explanatory variables is estimated as:

$$\Delta^4 x_t^f = \underset{(0.07)}{1.02} \Delta^4 y_t^3 + \underset{(0.07)}{0.17} \Delta^4 y_{t-1}^3 + \varepsilon_t, \quad \varepsilon_t = \underset{(0.10)}{0.59} \mu_{t-1} + \mu_t. \tag{4}$$

$$R^2 = 0.90, \quad \overline{R^2} = 0.90, \quad RMSE = 0.97,$$

where $\Delta^4 y^3$ is the annual growth rate calculated with (2). This model, contrary to (3), includes a lag of the explanatory variable, and both coefficients are positive.

With respect to (in-sample) nowcasting, the model (4) is as good as (3), but with a different specification. This evidence indicates that signals about the "true" GDP extracted from *IMACEC* are as reliable as those extracted from the first GDP release. Note, however, that nowcasting the final released GDP using only the contemporaneous *IMACEC*, i.e. without including a lag in the model (4), yields a *RMSE* of 1.45 and so does a worse job than the first released GDP data. Thus, in average, the first estimation of the GDP is closer to the "true" value than the growth rate calculated with *IMACEC* data from the same quarter.

The exercise in this subsection has demonstrated that, in general, the information contained in the *IMACEC* is as useful, with respect to nowcasting the "true" GDP growth rate, as the information contained in the first GDP release. The next subsection contains an analysis of the signals about the final GDP which can be extracted from the *IMACEC*.

### 4.2 Extracting GDP signals from the IMACEC

The monthly publications of *IMACEC* most likely contain useful information about the "true" quarterly GDP figure released much later and in this subsection it is investigated how much extra information, compared to historic GDP data, there is in respectively one, two and three months of *IMACEC* data published for the quarter in question.

Given $i$ ($i$ = 1,2,3) months of *IMACEC* data, the annual growth rate is calculated as:

$$\Delta^4 y_{t,\tau}^i = 100 * \left( \frac{\frac{1}{i}\sum_{h=1}^{i} y_{t_i,\tau}}{\frac{1}{i}\sum_{h=1}^{i} y_{t_i-12,\tau}} - 1 \right), \tag{5}$$

where the notation used is similar to the one applied in (2).

The benchmark model used for comparison includes the historical data available when the *IMACEC* is published, i.e. lagged observations of first release GDP rates. The model includes a constant, one lag of the first released GDP growth rate and an MA(3) specification for the residuals:

$$\Delta^4 x_t^f = \underset{(1.14)}{4.38} + \underset{(0.16)}{0.37}\Delta^4 x_{t-1}^1 + \varepsilon_t, \quad \varepsilon_t = \underset{(0.09)}{0.68}\mu_{t-3} + \underset{(0.12)}{0.46}\mu_{t-2} + \underset{(0.10)}{0.71}\mu_{t-1} + \mu_t. \tag{6}$$

$$R^2 = 0.74, \quad \overline{R^2} = 0.72, \quad RMSE = 2.04.$$

The model (6) explains more than 70% of the variation in final released growth rates. Part of the explanation comes from the lagged value of the first release data and an important share is explained by past errors. Note that a big part of the level of the growth rate is explained by the constant.

At time $t_1$ (when there is one month of *IMACEC* data available for the quarter) the estimated model is:

$$\Delta^4 x_t^f = \underset{(0.63)}{1.48} + \underset{(0.08)}{0.69}\Delta^4 y_t^1 + \underset{(0.09)}{0.25}\Delta^4 x_{t-1}^1 + \varepsilon_t, \quad \varepsilon_t = \underset{(0.09)}{0.70}\mu_{t-1} + \mu_t. \tag{7}$$

$$R^2 = 0.84, \quad \overline{R^2} = 0.83, \quad RMSE = 1.32,$$

where $\Delta^4 y^1$ is the annual *IMACEC* growth rate of the first month of quarter $t$, calculated indicated in (5). The first thing to note is that the coefficient of the *IMACEC* growth rate is significantly positive and, hence, does, as expected, contain extra information of the final released growth rate. This is also evident from the fact that the model (7) explains a greater part of the variation than (6) and that the constant is smaller, i.e. a greater part of the level of the growth rate is explained by the included variables. Finally, measured by the *RMSE*, equation (7) makes better (in-sample) nowcasts than (6); the performance is improved by 55%.

At time $t_2$ (with two month of *IMACEC* data available) the model estimated is:

$$\Delta^4 x_t^f = \underset{(0.07)}{0.98}\Delta^4 y_t^2 + \underset{(0.07)}{0.19}\Delta^4 x_{t-1}^1 + \varepsilon_t, \quad \varepsilon_t = \underset{(0.09)}{0.77}\mu_{t-1} + \mu_t. \tag{8}$$

$$R^2 = 0.89, \quad \overline{R^2} = 0.89, \quad RMSE = 1.04,$$

where $\Delta^4 y^2$ is the annual *IMACEC* growth rate for the two first month of the quarter $t$ calculated with formula (5). In the model (8), the constant term is not statistical significant, but, as in the regression (7), it includes a lagged GDP value[7] and an MA(1) model for the residuals. Compared to (7), the model (8) explains more of the variation in the final growth rate and makes better (in-sample) nowcasts; the performance is improved by 26%.

At time $t_3$ (three months of *IMACEC* available), the model estimated is very similar to the one reported in equation (4) but with the lagged *IMACEC* growth rate substituted by a lagged GDP rate:[8]

$$\Delta^4 x_t^f = \underset{(0.07)}{1.01}\Delta^4 y_t^3 + \underset{(0.07)}{0.18}\Delta^4 x_{t-1}^1 + \varepsilon_t, \quad \varepsilon_t = \underset{(0.11)}{0.57}\mu_{t-1} + \mu_t. \tag{9}$$

$$R^2 = 0.90, \quad \overline{R^2} = 0.90, \quad RMSE = 0.97,$$

where $\Delta^4 y^3$ is the annual *IMACEC* growth rate calculated with (5) for $i$ = 3. The model (9) does practically not explain more of the variation in the final growth rates than (8), but it does improve the (in-sample) nowcast performance with 7%.

To answer the question: "how much extra information about the "true" GDP growth rate does *IMACEC* data supply?", the evidence from the analysis above suggests that the nowcast performance improves with 55% when *IMACEC* from the first months of the

[7] A model including a constant term and not the lagged GDP value yields basically the same results as the model in equation (8). The latter was chosen for consistency with the information criteria used throughout the analysis.

[8] The results do not change if the lagged *IMACEC* growth rate is included instead of GDP nor if the specification includes a constant term and no lagged GDP rate. The specification reported in (9) is consistent with the information criteria used throughout the analysis.

quarter is available; it improves with another 26% when two months of *IMACEC* data are available and with an additional 7% when data for all three months are available.

## 5. Summary of results

In this paper it was analyzed what signals of the "true" GDP could be extracted from the monthly indicator of Chilean economic activity (*IMACEC*). For this purpose data from a recently constructed (and still work in progress) real-time database were used. The database was presented and the revisions of *IMACEC* and GDP data were analyzed with respect to the properties of nowcasting the "true" (finally revised) growth rates. It was shown how a simple model with *IMACEC* data could nowcast the "true" growth rates as well as a model including the first publication of the GDP, which is released three weeks later than the activity indicator.

With a benchmark model consisting of historical GDP observations, it was investigated how much extra information monthly *IMACEC* data could offer with respect to the "true" GDP. It was found that data of the first month every quarter improves the nowcast performance with 55%; and extra month of data improves the performance with another 26%; and with three months of data available the performance improves another 7%.

Since the construction of the real-time database of the Chilean GDP and its components, on the demand as well as the supply side, is still work in progress, there are several subjects which still need to be investigated. Among others, the following questions are interesting: Can specific components on the demand and / or the supply side explain GDP revisions? Is it possible to forecast the data revisions?  Do revisions affect short-term and mid-term forecasts? If so, does this have implications for the conduction of the monetary policy? These subjects will be left for future research.

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