# HIGH-FREQUENCY MONITORING OF THE SALVADORIAN ECONOMY[1]

*Quarterly GDP statistics in El Salvador are released by the Central Bank with a 3-month delay. This note proposes a simple nowcast model for an early assessment of the Salvadorian economy. The exercise is based on a bridge model, which exploits information for the period 2005-2017 from a large set of variables that are published earlier and at higher frequency than the variable of interest, in this case quarterly GDP. The estimated GDP growth rate in the 4th quarter of 2017, is 2.4 percent y/y, leading to an average GDP growth rate of 2.3 percent in 2017. This is in line with the GDP growth implied by the official statistics released two months later, in March 23, 2018.*

## A. Introduction

**1. The publication lag of crucial macroeconomic statistics requires the development of nowcast models to have an early estimate of economic conditions.** The nowcast provides an early indication of the current developments in economic activity, which allows to make a proper assessment of the economic stance before the official figures become available. In the case of El Salvador, national accounts are published with a 3-month delay. The basic principle of nowcasting is to exploit information that is published earlier and/or at higher frequency than the variable of interest, in this case quarterly GDP.

**2. The literature has proposed a variety of nowcasting methods.** The most prominent are autoregressive models, bridge equations, MIDAS regressions, vector autoregressive models (standard and with mixed frequencies), and the more sophisticated dynamic factors models. The different methodologies vary in the amount of high-frequency information used in the analysis, in the treatment of missing observation (particularly at the end of the sample period due to publication lags), and in the way the relationship between variables is modeled. Models that use monthly data generally outperform autoregressive models that are based only on quarterly data, and dynamic factor models produce more accurate nowcasts relative to the other model specifications (Liu, Matheson and Romeu, 2011). The simplicity of bridge and MIDAS equations reduces forecast accuracy relative to more sophisticated techniques, but facilitate the interpretation and communication of results. See Banbura et al. (2013) for a recent survey of nowcasting methods used in the literature.

**3. The Central Reserve Bank of El Salvador (BCR) has developed and is currently using a nowcast model based on Kalman filter techniques.** The methodology used by the institution was developed in 2009 as part of a cooperation agreement between ECLAC and the BCR, and updated in 2015 to include new high-frequency indicators. It is based on a dynamic factor model à la Stock and Watson (1991) as implemented by Camacho and Quiroz (2011). The BCR's nowcast model considers 17 indicators at monthly frequency: remittances, imports (excl. oil), cement consumption, U.S. monthly

[1] Prepared by Ana Lariau.

retail trade, total exports, tax revenue deflated with CPI, total government expenditure deflated by CPI, electricity production, maritime ports freight, IVAE agriculture, IVAE total, ISSS contributors, index of activity in the construction sector (FUSADES), business confidence index (FUSADES), index of industrial production (FUSADES), index of sales in commerce (FUSADES), index of sales in services (FUSADES). This methodology, as implemented by the BCR, provides a coincident indicator and a short-term forecast for aggregate GDP, but not for its components. It is possible to determine the direction of the effect (positive/negative) of new data releases on the forecast. However, interpretation could be difficult and specific channels through which these effects occur cannot be disentangled. Also, many monthly indicators are more closely related to subcomponents of production than to aggregate GDP.

**4. The purpose of this exercise is to develop a nowcasting tool with a disaggregated approach, which would complement the one already in use at the BCR.** Although the direct forecast of aggregate GDP has been the dominant approach, a more disaggregated analysis, e.g. at the sectoral level, could facilitate interpretation and explanation of economic developments, as well as communication of the results. While higher disaggregation does not necessarily lead to better forecasting ability (Drechsel and Scheufele, 2018), it makes interpretation and communication easier, particularly in policy-related environments. It provides background information on the drivers of changes in the GDP forecast. The purpose of this exercise is to develop a nowcasting tool with a disaggregated approach, which would complement the one already in use at the BCR. The methodology selected in this case is a bottom-up bridge model from the production side. Several studies have resorted to this methodology in the literature. For example, Cors and Kouzine (2003) and Drechsel and Scheufele (2018) for Germany; Barhoumi et al (2008) for France; Hahn and Skudelny (2008) for the Euro area.

**5. This note is organized as follows.** Section B describes the data used for the analysis. Section C provides details on the bridge model and its implementation in the case of El Salvador. Section D reports the results and main findings. Section E concludes and outlines directions in which the findings from this exercise could be refined and improved.

## B. Data Description

**6. The first step in the nowcasting exercise is to collect a large set of high-frequency variables (see details in Table A.1 in the Appendix), available at monthly frequency over the period 2005-2017.** The time span of the dataset is limited by data availability. While many high frequency indicators are available for longer periods, the revised national accounts and the monthly economic activity indicator are only available starting from 2005 (previous years are inconsistent due to a change in the sources and methodology to collect and compile the data). The dataset covers all the different sectors in the economy: real sector, monetary and financial sector, external sector, indicators of expectations of local firms, and indicators for the U.S. economy. It combines both "hard" indicators, such as standard macroeconomic variables of economic activity, employment, trade and government finances, as well as "soft" indicators like the FUSADES enterprise survey.

Financial variables, which are available at very high frequency, are also considered.[2] Given the strong ties between el Salvador and the U.S., with empirical evidence supporting the synchronization of their business cycles and spillover effects (Roache, 2008), variables that capture U.S. economic activity are included as well.[3]

**7. The nature of the methodology used implies that only a reduced subset of explanatory variables from the large dataset of high-frequency indicators is considered for the analysis.** The initial criteria to select variables from the comprehensive database is economic judgement as well as statistical testing procedures, rather than causal relationships. All possible variables at monthly frequency that could, at least theoretically, directly or indirectly affect the different supply components of GDP are considered and incorporated in the first round of regressions. Based on the results of this initial estimation, only the variables that showed a high explanatory power and a statistically significant relationship with the supply components of GDP are the ones that survive the selection process. This restricts the dataset only to a subgroup of variables that is detailed in Table 1.

**8. The analysis is done with annual growth rates.** Variables expressed in U.S. dollars are deflated using the CPI or the PPI (trade variables). When needed, monthly series are averaged up to the quarter. Seasonal adjustment is not needed since the analysis is based on annual growth rates. Growth rates are computed as the first difference of the logged variables relative to same month in the previous year. While quarterly and monthly growths rates would better capture the *momentum*, they are highly volatile, which makes it harder to establish statistically significant relationships between variables. Annual growth rates also address the drawbacks of standard techniques to remove seasonality and the effects of unit roots. First differences rather than growth rates are calculated in the case of unemployment rates, interest rates, and survey indicators.

## C. Methodology

**9. A supply-side bridge model is used to nowcast El Salvador's GDP growth.** This method is based on linear regressions that link a reduced number of high frequency indicators to the lower-frequency variable of interest, in this case the growth rate of quarterly GDP. Based on a bottom-up approach from the production side, GDP growth is nowcasted as the weighted sum of the nowcasted growth rates of the sectoral GDP in the quarterly national accounts, where the weights are the shares of each sector in the economy. The sectors considered, with their respective shares in parenthesis, are: agriculture, farming forestry and fishing (6 percent); construction (6 percent); manufacturing and mining (17 percent); electricity, gas and water supply (4 percent); transportation

[2] Banbura et al. (2013), find that financial variables have been proven to be not effective in improving the precision of short-term forecasts of GDP. However, they are the ones published at the highest frequency and with almost no delay, which are valuable features for nowcasting.

[3] The use of foreign indicators is a practice rarely found in the nowcasting literature. However, the strong ties of the U.S and the Salvadorian economies suggests that a forecasting model for El Salvador should consider the relationship with the U.S. This idea is developed by Caruso (2018), who proposes an econometric nowcasting model for the Mexican GDP that incorporates U.S. indicators.

**Table 1. El Salvador: Variables Used for Nowcasting the GDP Growth: Each Supply Component of GDP**

| Sector | Variable | Publication Delay |
|---|---|---|
| Agriculture, Hunting, Forestry & Fishing | IVAE_A | 2 months |
| | IMP_INT_A | 1 month |
| Construction | IVAE_CONS | 2 months |
| Manufacturing Industry and Mining | IVAE_IP | 2 months |
| | ISSS_IP | 2 months |
| | IMP_INT_MAN | 1 month |
| Electricity, Gas and Water | PROENER | 3 months |
| | IVAE_IP | 2 months |
| Transportation and Storage | TCRGPOR | 3 months |
| | IMP_K_TRAN | 1 month |
| Commerce | IVAE_CTRH | 2 months |
| | TAX_VAT | 1 month |
| | ISSS_CTRHIC | 2 months |
| | DECOMEMPL | 1 month |
| Hotels and Restaurants | IVAE_CTRH | 2 months |
| | ENTPSAJ | 3 months |
| | TAX_VAT | 1 month |
| | ISSS_CTRHIC | 2 months |
| Information and Communication | IVAE_IC | 2 months |
| Financial Services and Insurance | IVAE_FS | 2 months |
| Real Estate | IVAE_RE | 2 months |
| Government and Social Services | IVAE_GSS | 2 months |
| Other Services | ISSS_PUB | 2 months |
| | IVAE_OS | 2 months |

and storage (5 percent); information and communication (4 percent); commerce (14 percent); hotels and restaurants (3 percent); financial services and insurance (7 percent); real estate (8 percent); government and social services (17 percent); and other services (10 percent). The demand components could also be used to nowcast GDP growth in El Salvador. However, when this project started, the national accounts only had disaggregation of the supply side, but not of the demand side. With the release of the revised national accounts on March 23, 2018, which includes the disaggregation of GDP by demand component, this is now possible and it is the next natural step.

**10. The bridge model establishes a linear relationship between the growth rate of each supply component of GDP and the high-frequency indicators used as predictors.** Denote by $\Delta GDP_q^j$ the annual growth rate in quarter $q$ of component $j$ of GDP, and by $\Delta X_q^{ij}$ the annual growth rate in quarter $q$ of the high frequency indicator $i$ – aggregated to quarterly frequency – that is related to the component $j$ of GDP. The nowcast of the growth rate of each supply component $j$ is obtained by estimating the following regression. The specification of $X_q^{ij}$ is different depending on whether the regressor is a flow variable, a rate or an index, or a stock variable. Denote by $x_m^{ij}$ the observation as of

$$\Delta GDP_q^j = \alpha + \beta \times \Delta GDP_{q-1}^j + \sum_i \Theta^i \times \Delta X_q^{ij} + \epsilon_q^j. \qquad (1)$$

month $m$ of the high frequency indicator $i$ that is related to the component $j$ of GDP. Then:

- *Flow variables* (e.g. imports, exports, tax revenue, production of energy): $X_q^{ij}$ is the aggregate level of variable $i$ in quarter $q$, i.e. the sum of the observations in the three months of quarter $q$:
- *Rates and indices* (e.g. IVAE, interest rates, indicators of expectations of local firms): $X_q^{ij}$ is the

$$X_q^{ij} = \sum_{m=1}^{3} x_m^{ij}.$$

  average of variable $i$ in quarter $q$, i.e. the average of the observations in the three months of quarter $q$:

$$X_q^{ij} = \frac{1}{3} \sum_{m=1}^{3} x_m^{ij}.$$

- *Stock variables* (e.g. credit, number of contributors to social security): $X_q^{ij}$ is the value of variable $i$ at the end of quarter $q$, i.e. the value in the third month of quarter $q$:

$$X_q^{ij} = x_3^{ij}.$$

The equations for each sector of the economy are estimated by OLS using quarterly historical data for the period 2005-2014. Data for the period 2015-2017 is used to evaluate out-of-sample predictions.

**Table 2. El Salvador: Non-synchronous Arrival of Data**

| Reference Month | Publication Delay | | |
|---|---|---|---|
| | 1 Month | 2 Month | 3 Month |
| October, 2017 | | | |
| November, 2017 | October, 2017 | | |
| December, 2017 | November, 2017 | October, 2017 | |
| January, 2018 | December, 2017 | November, 2017 | October, 2017 |
| February, 2018 | | December, 2017 | November, 2017 |
| March, 2018 | | | December, 2017 |

**11. Data arrives in a non-synchronous manner, thus leading to successive updates of the nowcast throughout the quarter.** The high frequency indicators used as regressors in the bridge equations may be published with a 1-, 2- or 3-month delay. For illustration purposes, consider the last quarter of 2017, as shown in Table 2. The October data point of variables that have a 1-month publication delay will only become available in November; of variables with a 2-month delay, in December; and of variables with a 3-month delay in January. The same occurs with the November and December data points. The methodology exploits these lags in the publication of information, and allows to successively update the nowcast when more information regarding a variable becomes available. For instance, the nowcast of 2017Q4 as of December 2017 is different from the nowcast as of November 2017 because: (i) it incorporates both the October and the November data for the variables with a 1-month publication delay (and not just the October data as in the November 2017 nowcast); (ii) it incorporates the October data for the variables with a 2-month publication delay, which was not available in the November 2017 nowcast.

**12. The nowcast is computed by applying the coefficients estimated with the historical data to the new data releases.** For illustration, consider the nowcast of the growth rate of GDP in sector $j$ in the last quarter of 2017 ($\Delta\widehat{GDP}^{j}_{2017Q4}$). Denote by $\hat{\alpha}$, $\hat{\beta}$ and $\hat{\Theta}^{i}$ the estimated coefficients of Equation (1). Given the non-synchronous arrival of data, the nowcast changes throughout the quarter as additional information becomes available. The nowcast with data as of October, which becomes available after October 2017 given the publication delays, is computed as:

Similarly, the nowcast with data as of November 2017 is computed as:

$$\Delta\widehat{GDP}^{j}_{2017Q4} = \hat{\alpha} + \hat{\beta} \times \Delta GDP^{j}_{2017Q3} + \sum_i \widehat{\Theta}^{i} \left[ \frac{x^{ij}_{2017m10}}{x^{ij}_{2016m10}} - 1 \right]. \quad (4)$$

$$\Delta\widehat{GDP}^{j}_{2017Q4} = \hat{\alpha} + \hat{\beta} \times \Delta GDP^{j}_{2017Q3} + \sum_i \widehat{\Theta}^{i} \left[ \frac{x^{ij}_{2017m10} + x^{ij}_{2017m11}}{x^{ij}_{2016m10} + x^{ij}_{2016m11}} - 1 \right]. \quad (3)$$

Finally, the nowcast with data as of December 2017 is computed as:

$$\Delta\widehat{GDP}^{j}_{2017Q4} = \hat{\alpha} + \hat{\beta} \times \Delta GDP^{j}_{2017Q3} + \sum_i \widehat{\Theta}^{i} \left[ \frac{x^{ij}_{2017m10} + x^{ij}_{2017m11} + x^{ij}_{2017m12}}{x^{ij}_{2016m10} + x^{ij}_{2016m11} + x^{ij}_{2016m12}} - 1 \right]. \quad (2)$$

The calculations in equations (2)-(4) assume that all dependent variables are flow variables. If a dependent variable is an index, then the growth rate in brackets in equations (2)-(4) is computed with averages rather than sums. If a dependent variable is a rate, then the difference (rather than the growth rate) is computed, based on averages and not sums. If a regressor is a stock variable, its growth rate is calculated with the last data point available rather than with sums or averages.[4]

**13. The fit of out-of-sample estimates is good, partly reflecting the consistency between the quarterly national accounts and the monthly economic activity indicator whenever used.** The out-of-sample nowcasts for each sector over the period 2015Q1-2017Q3 are shown in the shaded areas of Figure 1. There are sectors, such as Electricity Gas and Water, Transportation and Storage, and Hotel and Restaurants, for which the fit could be improved. These sectors do not have a disaggregated monthly activity indicator (it is just pooled with the one of other sectors); if more variables relevant for these sectors were available at high frequency and with shorter publication delays, the fit and predictions for these sectors could be improved.

## D. Results

**14. GDP growth in 2017Q4 is nowcasted at 2.4 percent.** Consequently, given the actual values for Q1-Q3, the nowcasted GDP growth for 2017 with data as of January 31st, 2018, stands at 2.3 percent, as shown in Table 3. This result is consistent with the actual GDP growth displayed by the revised statistics published on March 23, 2018.

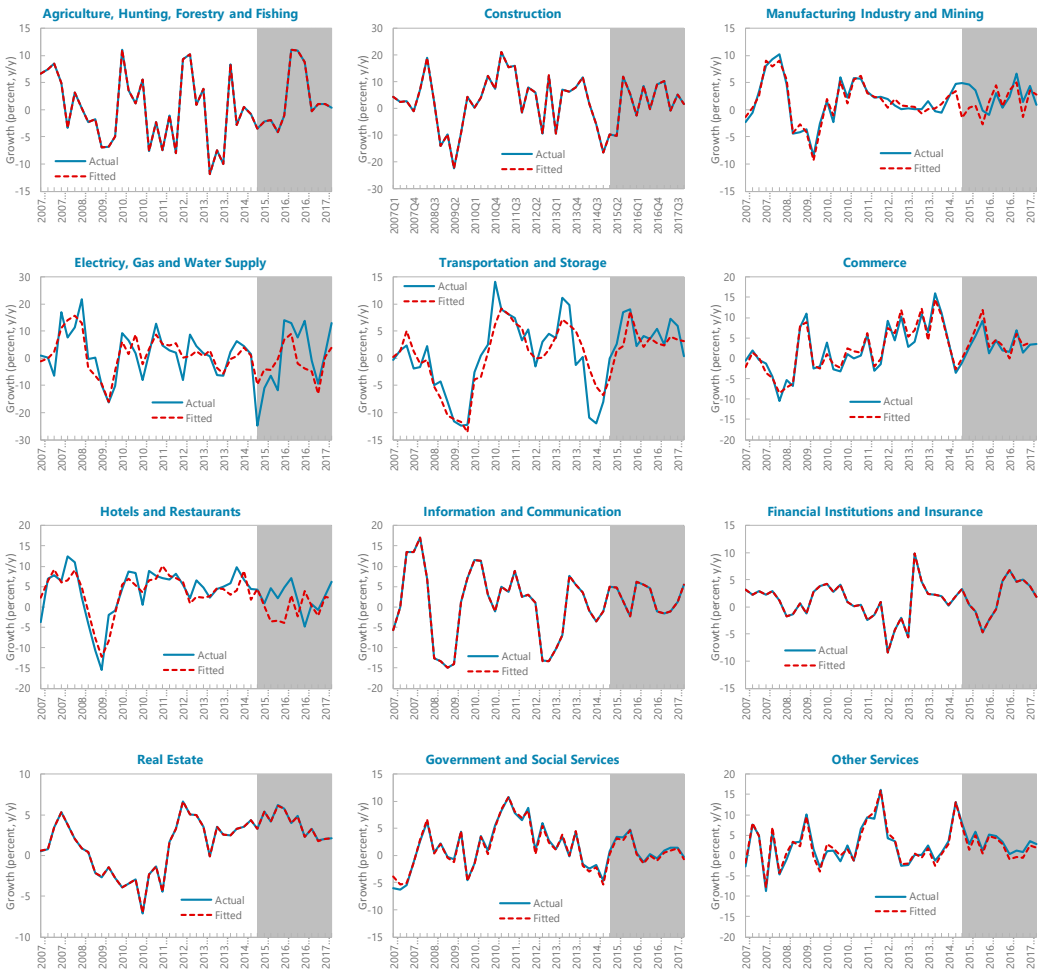
[4] Note that the calculations in equations (2)-(4) is the simplest way of addressing the presence of missing data at the end of the sample due to publication lags. Other approaches have been used in the literature. For example, resorting to univariate forecasting techniques to predict the behaviour of the regressors for the remainder of the quarter (Hahn and Skudelny, 2008). An alternative is to address the missing data problem using Kalman filter techniques in the context of a state space mode.

**Table 3. El Salvador: GDP Growth Nowcast for 2017Q4 as of January 31, 2018**

| Quarter | GDP Growth (percent) | Type of Figure |
|---|---|---|
| 2017 Q1 | 3.4 | Actual |
| 2017 Q2 | 0.3 | Actual |
| 2017 Q3 | 3.1 | Actual |
| 2017 Q4 | 2.4 | Nowcast |
| **2017** | **2.3** | **Actual + Nowcast** |

Sources: Central Reserve Bank of El Salvador and Fund staff estimates.

**Figure 1. El Salvador: Fitted Values of OLS Regressions and Out-of-Sample Predictions**




Sources: Central Reserve Bank of El Salvador and Fund staff estimates.

**15. The arrival of new data leads to the nowcast being successively altered.** The regression coefficients remain unchanged; the revised nowcast is driven by the incremental information provided by the new data. Table 4 illustrates this revision process for the nowcast of 2017Q4. The nowcast of GDP growth goes slightly up in November 2017 from 2.7 percent to 2.8 percent due to an acceleration in the activity of Hotels and Restaurants, which is partially offset by a slowdown in Commerce. In December, new information regarding all variables is released and, therefore, the nowcast is revised downwards to 2.1 percent. This behavior was driven by a slowdown in most sectors, particularly Construction, and Electricity Gas and Water. Again, this was partially offset by improved performance in Transportation, Information and Communication, and Other Services. Finally, in January the nowcast is revised up again to 2.4 percent. This is explained by positive signals in Construction and Electricity, Gas and Water, and to a lesser extent by Industrial Production. Also, several services activities showed improved performance. Only the primary sector, Financial Services and Insurance, and Government Services displayed a persistent slowdown in activity throughout the quarter. The lower growth rate of Government Services may reflect the fiscal consolidation efforts that took place towards the end of 2017.

**Table 4. El Salvador: Update of the Nowcast of GDP Growth in 2017Q4 for Each Supply Component of GDP**

| **Nowcast Period** | **t-2** | **t-1** | **t** | **t+1** |
|---|---|---|---|---|
| **Date** | **Oct-17** | **Nov-17** | **Dec-17** | **Jan-18** |
| Agriculture, Hunting, Forestry & Fishing | 1.0 | 1.0 | 0.7 | 0.4 |
| Construction | 5.3 | 5.3 | -4.1 | 0.3 |
| Manufacturing Industry & Mining | 3.9 | 3.9 | 2.4 | 3.7 |
| Electricity, Gas & Water | 0.5 | 0.5 | -1.5 | 4.8 |
| Transportation and Storage | 3.4 | 3.4 | 4.2 | 0.5 |
| Information and Communication | 1.2 | 1.2 | 6.0 | 5.5 |
| Commerce | 4.0 | 3.9 | 3.5 | 5.9 |
| Hotels and Restaurants | 2.5 | 3.5 | 2.7 | 2.9 |
| Financial Institutions and Insurance | 3.8 | 3.8 | 2.0 | 1.9 |
| Real Estate | 2.0 | 2.0 | 2.1 | 2.2 |
| Government and Social Services | 1.3 | 1.3 | 0.8 | 0.5 |
| Other Services | 2.5 | 2.5 | 5.6 | 3.3 |
| **Nowcasted GDP Growth** | **2.7** | **2.8** | **2.1** | **2.4** |

Source: Fund staff estimates.
Note: Cells highlighted in green (red) represent new information releases that are driving an upward (downward) revision in the GDP growth nowcast.

## E. Conclusions

**16. This note proposes a simple nowcasting model for high-frequency monitoring of the Salvadorian economy.** The exercise is based on a bridge model, which exploits information for the period 2005-2017 from a large set of variables that are published earlier and at higher frequency than the quarterly GDP. The nowcasted GDP growth in 2017 is 2.3 percent, consistent with the data published by the BCR in March 2018.

**17. The bridge model is one of the many tools available for nowcasting.** While it is the simplest tool from a technical point of view, this disaggregated approach helps to better understand the underlying drivers of the economy and the impact of new information on each component of GDP. In this sense, this tool could be thought as complementary to the model currently used by the BCR.

**18. This exercise could be improved in several dimensions.** Future lines of work include: (i) considering alternative methods to deal with missing data at the end of the sample period, e.g., using univariate techniques to produce forecasts of the regressors; (ii) considering alternative specifications of the bridge equations, by incorporating lags of the regressors and by changing the estimated equation over the forecast cycle as suggested by Hahn and Skudelny (2008); (iii) replicating this methodology using demand-side components rather than supply-side components. The latter would provide a more comprehensive view of economic developments in the short-run. It would to determine whether GDP growth is weak due to subdued growth of a specific demand component, or if it is the result from structural problems or shocks to a particular economic sector.

# Annex I. Data Description

## Table AI.1. El Salvador: Data Description

| Number | Abbreviation | Variable description | Start | End | Frequency | Source |
|---|---|---|---|---|---|---|
| **I. REAL SECTOR** | | | | | | |
| **I.1 Economic Activity** | | | | | | |
| 1 | IVAE | IVAE | Jan-05 | Dec-17 | Monthly | BCR |
| 2 | IVAE_A | IVAE: Agriculture | Jan-05 | Dec-17 | Monthly | BCR |
| 3 | IVAE_CONS | IVAE: Construction | Jan-05 | Dec-17 | Monthly | BCR |
| 4 | IVAE_IP | IVAE: Manufacturing industry and mining | Jan-05 | Dec-17 | Monthly | BCR |
| 5 | IVAE_CTRH | IVAE: Commerce, transportation and storage, hotels and restaurants | Jan-05 | Dec-17 | Monthly | BCR |
| 6 | IVAE_FS | IVAE: Financial services and insurance | Jan-05 | Dec-17 | Monthly | BCR |
| 7 | IVAE_RE | IVAE: Real estate | Jan-05 | Dec-17 | Monthly | BCR |
| 8 | IVAE_IC | IVAE: Information and communication | Jan-05 | Dec-17 | Monthly | BCR |
| 9 | IVAE_GSS | IVAE: Government and social services | Jan-05 | Dec-17 | Monthly | BCR |
| 10 | IVAE_OS | IVAE: Other services | Jan-05 | Dec-17 | Monthly | BCR |
| **I.2 Employment** | | | | | | |
| 11 | ISSS | ISSS contributors: Total | Jan-99 | Nov-17 | Monthly | ISSS |
| 12 | ISSS_PRI | ISSS contributors: Private | Jan-91 | Nov-17 | Monthly | ISSS |
| 13 | ISSS_PUB | ISSS contributors: Public | Jan-99 | Nov-17 | Monthly | ISSS |
| 14 | ISSS_A | ISSS contributors: Agriculture | Jan-91 | Nov-17 | Monthly | ISSS |
| 15 | ISSS_IP | ISSS contributors: Manufacturing industry, mining, other industrial activities | Jan-91 | Nov-17 | Monthly | ISSS |
| 16 | ISSS_CONS | ISSS contributors: Construction | Jan-91 | Nov-17 | Monthly | ISSS |
| 17 | ISSS_CTRHIC | ISSS contributors: Commerce, transportation and storage, hotels and restaurants, information and communication | Jan-91 | Nov-17 | Monthly | ISSS |
| 18 | ISSS_FSRE | ISSS contributors: Financial services, insurance, real estate, corporate services | Jan-91 | Nov-17 | Monthly | ISSS |
| 19 | ISSS_OS | ISSS contributors: Communal, social and personal services | Jan-91 | Nov-17 | Monthly | ISSS |
| **I.3 Prices** | | | | | | |
| 20 | CPI | Consumer Price Index | Jan-90 | Dec-17 | Monthly | DIGESTYC, published by BCR |
| 21 | PPI | Producer Price Index | Jan-09 | Dec-17 | Monthly | DIGESTYC, published by BCR |
| 22 | WPI | Wholesale Price Index | Jan-90 | Oct-17 | Monthly | DIGESTYC, published by BCR |
| **I.4 Other indicators** | | | | | | |
| 23 | CONCEM | Cement consumption | Jan-90 | Dec-17 | Monthly | CESSA, published by BCR |
| 24 | CONENER | Electricity consumption | Jan-90 | Dec-17 | Monthly | UT, published by BCR |
| 25 | PROENER | Electricity production | Jan-90 | Dec-17 | Monthly | UT, published by BCR |
| 26 | TCRGAER | Air freight | Jan-90 | Dec-17 | Monthly | CEPAL, published by BCR |
| 27 | TCRGPOR | Maritime freight | Jan-90 | Dec-17 | Monthly | CEPAL, published by BCR |
| 28 | ENTPSAJ | Passenger entry | Jan-90 | Dec-17 | Monthly | BCR |
| 29 | SALPSAJ | Passenger exit | Jan-90 | Dec-17 | Monthly | BCR |

## Table AI.1. El Salvador: Data Description (continued)

| Number | Abbreviation | Variable description | Start | End | Frequency | Source |
|---|---|---|---|---|---|---|
| **II. EXTERNAL SECTOR** | | | | | | |
| 30 | EXP_SUGAR | Exports: Sugar | Jan-91 | Dec-17 | Monthly | BCR |
| 31 | EXP_COFFEE | Exports: Coffee | Jan-91 | Dec-17 | Monthly | BCR |
| 32 | EXP_SHRIMP | Exports: Shrimp | Jan-91 | Dec-17 | Monthly | BCR |
| 33 | EXP_MAQUIL | Exports: Maquila | Jan-91 | Dec-17 | Monthly | BCR |
| 34 | EXP_NTCA | Exports: Non-traditional to CA | Jan-91 | Dec-17 | Monthly | BCR |
| 35 | EXP_NTOCA | Exports: Non-traditional outside of CA | Jan-91 | Dec-17 | Monthly | BCR |
| 36 | EXP_NTRA | Exports: Non-traditional | Jan-91 | Dec-17 | Monthly | BCR |
| 37 | EXP | Exports: Total | Jan-91 | Dec-17 | Monthly | BCR |
| 38 | EXP_TRAD | Exports: Traditional | Jan-91 | Dec-17 | Monthly | BCR |
| 39 | IMP_OCA | Imports: Outside CA | Jan-91 | Dec-17 | Monthly | BCR |
| 40 | IMP_MAQUIL | Imports: Maquila | Jan-91 | Dec-17 | Monthly | BCR |
| 41 | IMP_CA | Imports: CA | Jan-91 | Dec-17 | Monthly | BCR |
| 42 | IMP | Imports: Total | Jan-91 | Dec-17 | Monthly | BCR |
| 43 | IMP_CONS | Imports: Consumer Goods | Jan-91 | Dec-17 | Monthly | BCR |
| 44 | IMP_INT | Imports: Intermediate Goods | Jan-91 | Dec-17 | Monthly | BCR |
| 45 | IMP_INT_man | Imports: Intermediate Goods: Manufacture Industry | Jan-91 | Dec-17 | Monthly | BCR |
| 46 | IMP_INT_agr | Imports: Intermediate Goods: Agricultural | Jan-91 | Dec-17 | Monthly | BCR |
| 47 | IMP_INT_con | Imports: Intermediate Goods: Construction | Jan-91 | Dec-17 | Monthly | BCR |
| 48 | IMP_k | Imports: Capital Goods | Jan-91 | Dec-17 | Monthly | BCR |
| 49 | IMP_K_man | Imports: Capital Goods: Manufacture Industry | Jan-91 | Dec-17 | Monthly | BCR |
| 50 | IMP_K_tran | Imports: Capital Goods: Transport | Jan-91 | Dec-17 | Monthly | BCR |
| 51 | IMP_K_tran_v | Imports: Capital Goods: Vehicular Transport | Jan-92 | Dec-17 | Monthly | BCR |
| 52 | IMP_K_agr | Imports: Capital Goods: Agricultural | Jan-91 | Dec-17 | Monthly | BCR |
| 53 | IMP_K_con | Imports: Capital Goods: Construction | Jan-91 | Dec-17 | Monthly | BCR |
| 54 | IMP_K_com | Imports: Capital Goods: Commerce | Jan-94 | Dec-17 | Monthly | BCR |
| 55 | IMP_K_serv | Imports: Capital Goods: Service | Jan-94 | Dec-17 | Monthly | BCR |
| 56 | IMP_K_util | Imports: Capital Goods: Electric & Water Services | Jan-94 | Dec-17 | Monthly | BCR |
| 57 | IMP_K_bank | Imports: Capital Goods: Banking | Jan-94 | Dec-17 | Monthly | BCR |
| 58 | IMP_K_other | Imports: Other Capital Goods | Jan-91 | Dec-17 | Monthly | BCR |
| 59 | REM | Remittances | Jan-91 | Dec-17 | Monthly | BCR |
| **III. FISCAL SECTOR** | | | | | | |
| 60 | PUB_SPEND | Government spending | Jan-94 | Dec-17 | Monthly | Ministry of Finance, published by BCR |
| 61 | PUB_REV | Revenue | Jan-94 | Dec-17 | Monthly | Ministry of Finance, published by BCR |
| 62 | TAX | Tax revenue | Jan-94 | Dec-17 | Monthly | Ministry of Finance, published by BCR |
| 63 | TAX_VAT | VAT | Jan-94 | Dec-17 | Monthly | Ministry of Finance, published by BCR |
| 64 | TAX_INCOME | Income tax | Jan-94 | Dec-17 | Monthly | Ministry of Finance, published by BCR |
| 65 | PUB_INV | Public investment | Jan-94 | Dec-17 | Monthly | Ministry of Finance, published by BCR |
| **IV. MONETARY/FINANCIAL SECTOR** | | | | | | |
| 66 | CREDIT | Total credit | Jan-02 | Dec-17 | Monthly | BCR |
| 67 | CREDIT_HH | Credit to households | Jan-02 | Dec-17 | Monthly | BCR |
| 68 | CREDIT_FIRMS | Credit to firms | Jan-02 | Dec-17 | Monthly | BCR |
| 69 | CREDIT_HOUSE | Credit to households for housing | Jan-02 | Dec-17 | Monthly | BCR |
| 70 | m3 | M3 | Jan-02 | Dec-17 | Monthly | BCR |
| 71 | TP30 | Deposit rate (30 days) | Mar-95 | Dec-17 | Monthly | BCR |
| 72 | TB1Y | Loan rate (loans over 1 year) | Jan-96 | Dec-17 | Monthly | BCR |
| 73 | TB180 | Deposit rate (180 days) | Jan-95 | Dec-17 | Monthly | BCR |
| **V. EXPECTATIONS (ENCUESTA DINAMICA EMPRESARIAL - FUSADES)** | | | | | | |
| 74 | DERGI | Global - Investment | Mar-95 | Dec-17 | Monthly | FUSADES |
| 75 | DECOMEMPL | Retail trade - Employment | Mar-95 | Dec-17 | Monthly | FUSADES |
| 76 | DECOMINVR | Retail trade - Investment | Mar-95 | Dec-17 | Monthly | FUSADES |
| 77 | DEVSS | Services - Sales | Mar-94 | Dec-17 | Monthly | FUSADES |
| 78 | DEVSI | Industry - Sales | Mar-94 | Dec-17 | Monthly | FUSADES |
| 79 | DEVSCO | Retail trade - Sales | Mar-94 | Dec-17 | Monthly | FUSADES |
| 80 | DEPSI | Industry - Production | Mar-94 | Dec-17 | Monthly | FUSADES |
| 81 | DERV | Global - Sales | Mar-94 | Dec-17 | Monthly | FUSADES |

**Table AI.1. El Salvador: Data Description** (concluded)

| Number | Abbreviation | Variable description | Start | End | Frequency | Source |
|---|---|---|---|---|---|---|
| **VI. US** | | | | | | |
| 82 | PIBTUSA | US Quarterly GDP | Mar-90 | Dec-17 | Quarterly | Bureau of Economic Analysis |
| 83 | DESPUSA | US civilian unemployment rate | Jan-90 | Dec-17 | Monthly | Bureau of Labor Statistics |
| 84 | DESHISPUSA | US hispanic civilian unemployment rate | Jan-90 | Dec-17 | Monthly | Bureau of Labor Statistics |
| 85 | FEDFE | Federal Funds Effective Rate | Jan-90 | Dec-17 | Monthly | Federal Reserve (FED) |
| 86 | IPGUS | US Total Production Index | Jan-90 | Dec-17 | Monthly | Federal Reserve (FED) |
| 87 | IPIG | US Industrial Production Index | Jan-90 | Dec-17 | Monthly | Federal Reserve (FED) |
| 88 | TB6CM | Interest rate on 6-month Treasury Bills | Jan-90 | Dec-17 | Monthly | Federal Reserve (FED) |

# References

Banbura, Martha, Giannone, Domenico, Modugno, Michèle and Lucrezia Reichlin, 2013, "Now-Casting and the Real-Time Data Flow," *Handbook of Economic Forecasting*, Elsevier, vol. 2(A), chapter 4, pages 195-237.

Barhoumi, K., Brunhes-Lesage, V., Darné, O., Ferrara, L., Pluyaud, B. and B. Rouvreau, 2008, "Monthly forecasting of French GDP: A revised version of the OPTIM model", Working Paper 222, Banque de France.

Camacho, Máximo and Gabriel Pérez Quirós, 2011, "Latin STINGS: indicadores de crecimiento a corto plazo de los países de América Latina," *Macroeconomía del Desarrollo 108*, United Nations Economic Commission for Latin America and the Caribbean (ECLAC).

Caruso, Alberto, 2018, "Nowcasting with the help of foreign indicators: The case of Mexico," *Economic Modelling*, Elsevier, vol. 69(C), pages 160-68.

Cors, Andreas and Vladimir Kouzine, 2003, "An approach for timely estimations of the German GDP", *Journal of the German Statistical Society*, vol. 87, issue 2, p. 201-220.

Drechsel, Katja and Rolf Scheufele, 2018. "Bottom-up or direct? Forecasting German GDP in a data-rich environment", *Empirical Economics*, 54, issue 2, p. 705-45.

Hahn, Elke and Frauke Skudelny, 2008, "Early Estimates of Euro Area Real GDP Growth: A Bottom Up Approach from the Production Side", Working Paper No. 975, European Central Bank.

Liu, Philip, Matheson, Troy and Rafael Romeu, 2011, "Real-time forecasts of economic activity for Latin American economies", IMF Working Paper WP/11/98, International Monetary Fund.

Roache, Shaun K., 2008, "Central America's Regional Trends and U.S. Cycles," Working Paper No 08/50, International Monetary Fund, February.

Stock, James H., and Mark W. Watson, 1991, "A probability model of the coincident economic indicators," in *Leading Economic Indicators: New Approaches and Forecasting Records*, edited by K. Lahiri y G. Moore, Cambridge University Press, pp. 63-85.