DEPARTMENT OF ECONOMIC

DEVELOPMENT

AND COMMERCE

GOVERNMENT OF PUERTO RICO

Puerto Rico Economic Activity Index (PR-EAI)
Methodological Framework - May 2026

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Background

The Puerto Rico Economic Activity Index (PR-EAI) was originally developed by Dr. Fernando Lugo, Ph.D., at the Office of Economic Analysis of the Government Development Bank of Puerto Rico (GDB). Due to the closure of the institution in March 2018 the employees that worked with economic activity index (GDB-EAI) were transferred to the Economic Development Bank for Puerto Rico (EDB) and they continued with its publication as the EDB-EAI. As of November 3rd, 2025, the Index was transferred to the Puerto Rico Department of Economic Development and Commerce (DEDC), and it is now being published as PR-EAI.

Problem Statement

- The Puerto Rico Planning Board publishes the Income and Product Accounts on an annual basis.
- Different monthly economic indicators usually present contradictory signals.
- It is useful to have a variable which summarizes the behavior of several economic monthly economic indicators.
- The Planning Board used to publish a coincident economic activity index once-a-month, but they stopped doing so by August 2017.

Purpose of the PR-EAI

- The objectives of the PR-EAI are:
  - To summarize the behavior of several monthly economic indicators.
  - To be able to publish it in a timely manner.
  - That its annual values maintain a high correlation to the real GNP in two dimensions:
    - On the levels
    - On the growth rates
- To illustrate that stating as a fact that the PR-EAI is highly correlated to the real GNP is not the same as saying that the Index directly estimates the behavior of the real GNP. In other words, the PR-EAI is not a monthly estimate of the real GNP.

Trade-off between stability and sensitivity

- Stability: the level of the index should not vary abruptly, unless there is a major event that could justify such a behavior. The index should not respond to random movements of its components.
- Sensitivity: the level of the index should respond quickly to actual changes in the activity. It should respond to the trend, not to “noise”.
- Trade-off: the more stable the index is, the less sensitive it is to short-run changes.
- The index should be stable enough to not respond to noise, and sensitive enough to respond to actual changes in the economic activity.

Trade-off between precision and timeliness

- Precision: the level and the changes in the index should be a good measure of the objective variable they intend to measure.
- Timeliness: the components of the index should be readily available after the end of the closing month, such that the index could be computed quickly.
  - The components should be published, not estimated.
  - The index should be coincident: it should be used to provide a current diagnosis, and not only for historical analysis.
- Trade-off: the more precise the index is, the less timely it is.
- The index should be stable and precise enough to measure adequately the activity but on a timely basis.

Parsimony principle

- "Ockham's razor": among competing hypotheses to explain a phenomenon, the simplest should be selected.
- In other words, facing alternative explanations for the same problem, the simplest should be selected.
  - If few variables are enough to describe a phenomenon, then why to use many more variables for that purpose?
- Parsimony principle: to avoid redundancy in the explanations.

Criteria used by the Economic Analysis Office of the GDB for the selection of variables

- Variables that would not required adjustment for inflation.
  - Puerto Rico has suffered from lack of adequate price measurements at different production and distribution levels.
  - The variables included do not depend on the CPI nor on any other price index variable.
- The components should be readily available after the end of each month, i.e., the components should obey the timeliness requirement.
  - The components should not be forecasted to obtain an estimate of the index.
- The components should not bring redundant information.
- The components should be relatively highly correlated to the objective variable at two instances: at the levels and at the growth rates.

Some advantages of the PR-EAI

- It does not contain monetary variables.
  - It does not depend on the CPI nor on any other price index variable to adjust other variables.
- It contains few variables (it is parsimonious).
  - Advantages:
    - It depends on few sources for its compilation.
    - It is timelier.
  - Disadvantages:
    - It does not collect information from all different sectors of the economy.
    - It is more volatile.
- The components are readily available after the end of each month (it is timely).
- The components are not forecasted nor estimated: as soon as the data series are ready, the index is computed directly.

Composition of the PR-EAI

The PR-EAI is composed by four monthly indicators:

Variable	Release date
Total Non-Farm Payroll Employment (BLS, Establishment Survey, thousand of employees)	Middle of the next month
Total Electric Power Generation (LUMA, million of kWh)	Middle of the next month
Total Cement Sales (DEDC, million of 94lbs bags)	At the beginning of the next month
Consumption of Gasoline (Treasury Department, million of gallons)	At the end of the next month

Notice that the Index should be published by the end of each month, unless there are major problems with the publication of primary data.

Correlations

- The components of the PR-EAI should show high correlations with the objective variable (with the real GNP, for our purposes).
- The PR-EAI shows high correlations with Puerto Rico's real GNP in both:
- Levels:
  - The value of the variables with the values of the real GNP.
- Differences:
  - Growth rates of the components with the real GNP growth rate.

Correlations (2)

- The variables with the highest correlations with real GNP are:
- At the levels from FY1981 to FY2025
  - Gasoline consumption
  - Electric power generation
  - Total payroll employment
- At the growth rates from FY1982 to FY2025
  - Total payroll employment
  - Cement sales

Pearson correlations of real GNP with	
Gasoline Consumption	**0.9528**
Electric Power Generation	**0.9740**
Cement Sales	**0.3882**
Total Payroll Employment	**0.9676**

Pearson correlations of real GNP growth with growth of	
Gasoline Consumption	**0.3052**
Electric Power Generation	**0.5494**
Cement Sales	**0.6969**
Total Payroll Employment	**0.8594**

Seasonal Adjustments

- Monthly and quarterly economic time series usually show seasonality
- Seasonality adjustments are necessary for different purposes
  - Comparisons of adjacent observations
  - Volatility analysis
- Different methods for seasonality adjustments
  - Methods of fixed seasonal factors: examples
    - Additive Moving-Average Method
    - Multiplicative Moving-Average Method
  - Methods of variable seasonal factors: examples
    - X-11
    - X-12
    - Tramo-Seats

Seasonal Adjustments (2)

- Method used for the PR-EAI: Tramo-Seats
  - Advantages:
    - It generates variable seasonal factors, more accordingly to what is observed in reality.
    - It diminishes the volatility of all the components of the Index, and therefore, of the Index itself.
    - It generates an index in which month-over-month comparisons are more plausible.
  - Disadvantages:
    - It is not simple to reproduce nor to apply without the proper statistical software.
    - Year-over-year the seasonal factors are similar, but not identical. Therefore, it also requires a forecast for the seasonal factors, i.e., the previous year adjustments are not identical to the current ones.

What comprises the index?

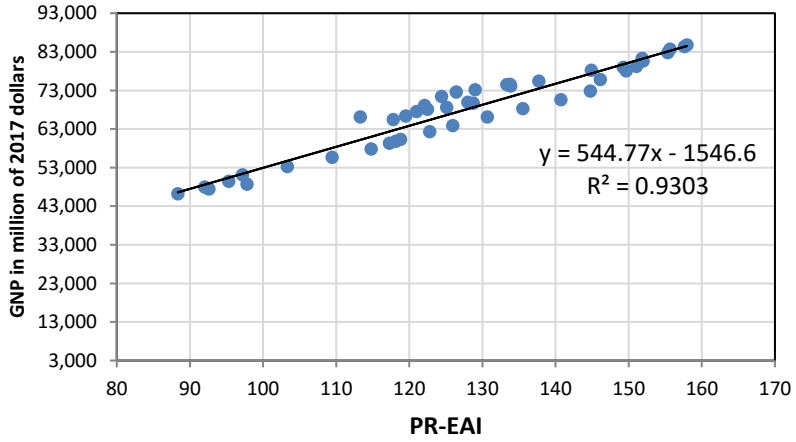
- Levels?
  - No, because not all variables have the same magnitude and volatility.
- Percent change of the levels?
  - No, because highly volatile series would weigh more than the less volatile.
- Standardization
  - Yes; the process by which all components are taken to an equally volatile symmetric percent changes.
- Percent change of the standardized series?
  - Yes, these changes add up to have a result of the selection of variables in the index.

Results: coefficients of determination

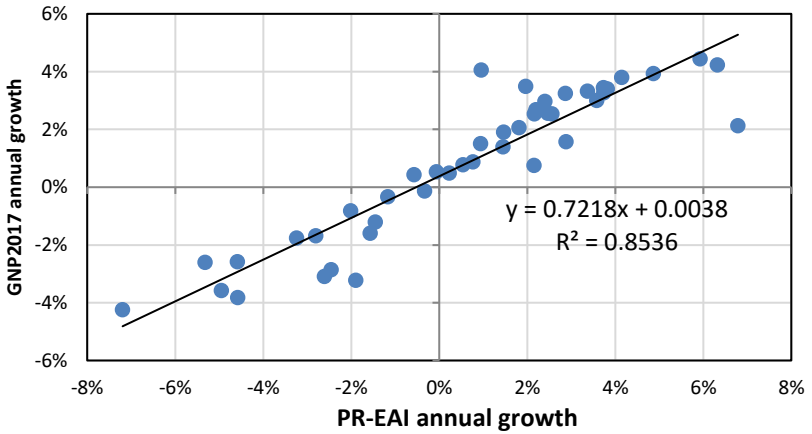
The levels of PR-EAI show a high correlation (with a coefficient of determination of 0.93) with respect to the levels of the real GNP.

The growth rates of the PR-EAI show a high correlation (with a coefficient of determination of 0.85) with respect to the corresponding rates of real GNP.

Relationship on the levels: (FY1981-FY2025)



Relationship on the growth rates (FY1982-FY2025)



Comparison of the growth rates

- The PR-EAI y-o-y growth does not attempt to estimate the annual growth of the real GNP.
  - Being more volatile, both highs and lows are more notable in the PR-EAI.

- However, the annual growth of real GNP may be approximated with the PR-EAI growth.
  - G%GNP = 0.7218/(G%EAI) + 0.0038 (corrected for autocorrelation)
  - This relation is an approximation that varies across time.

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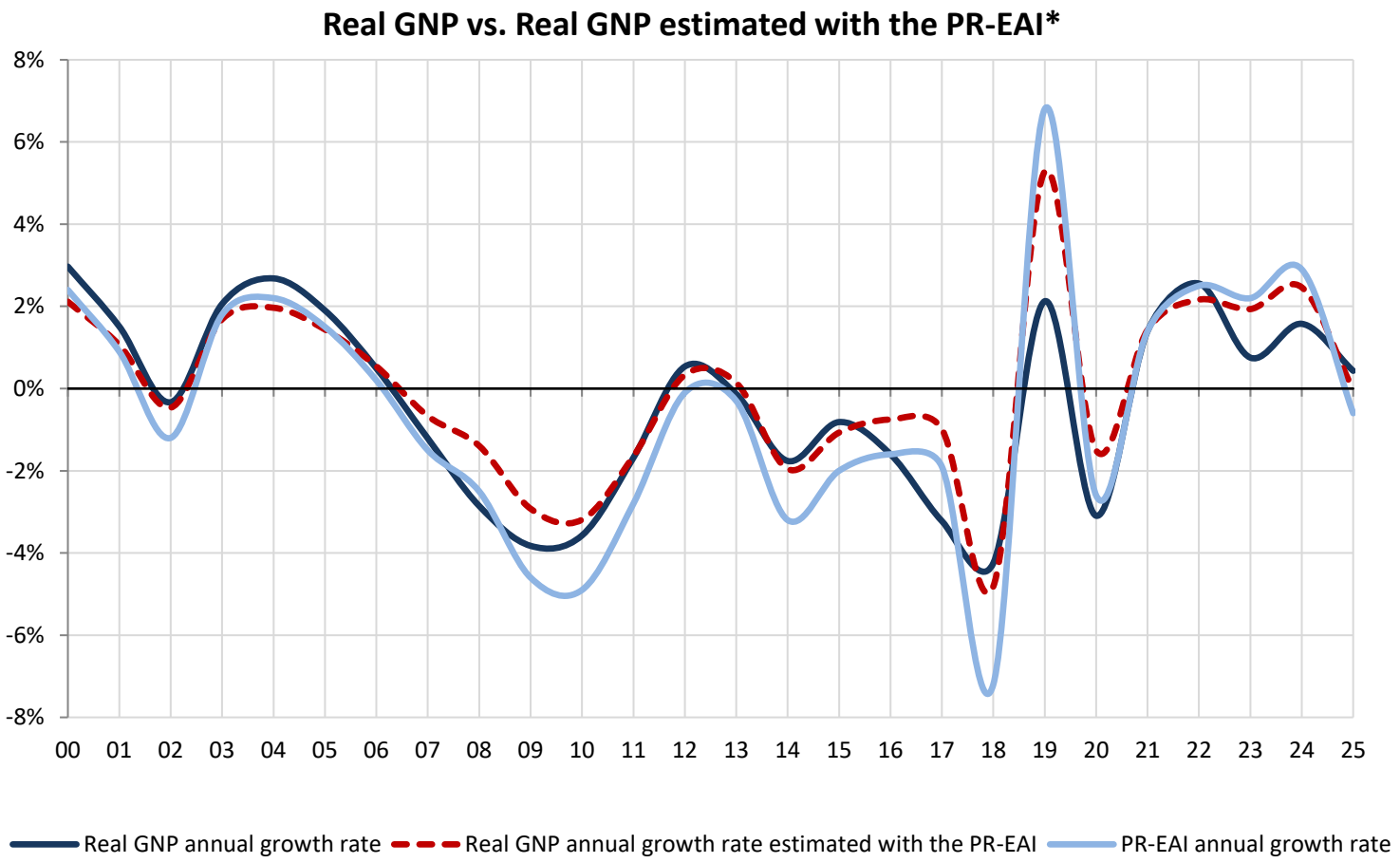
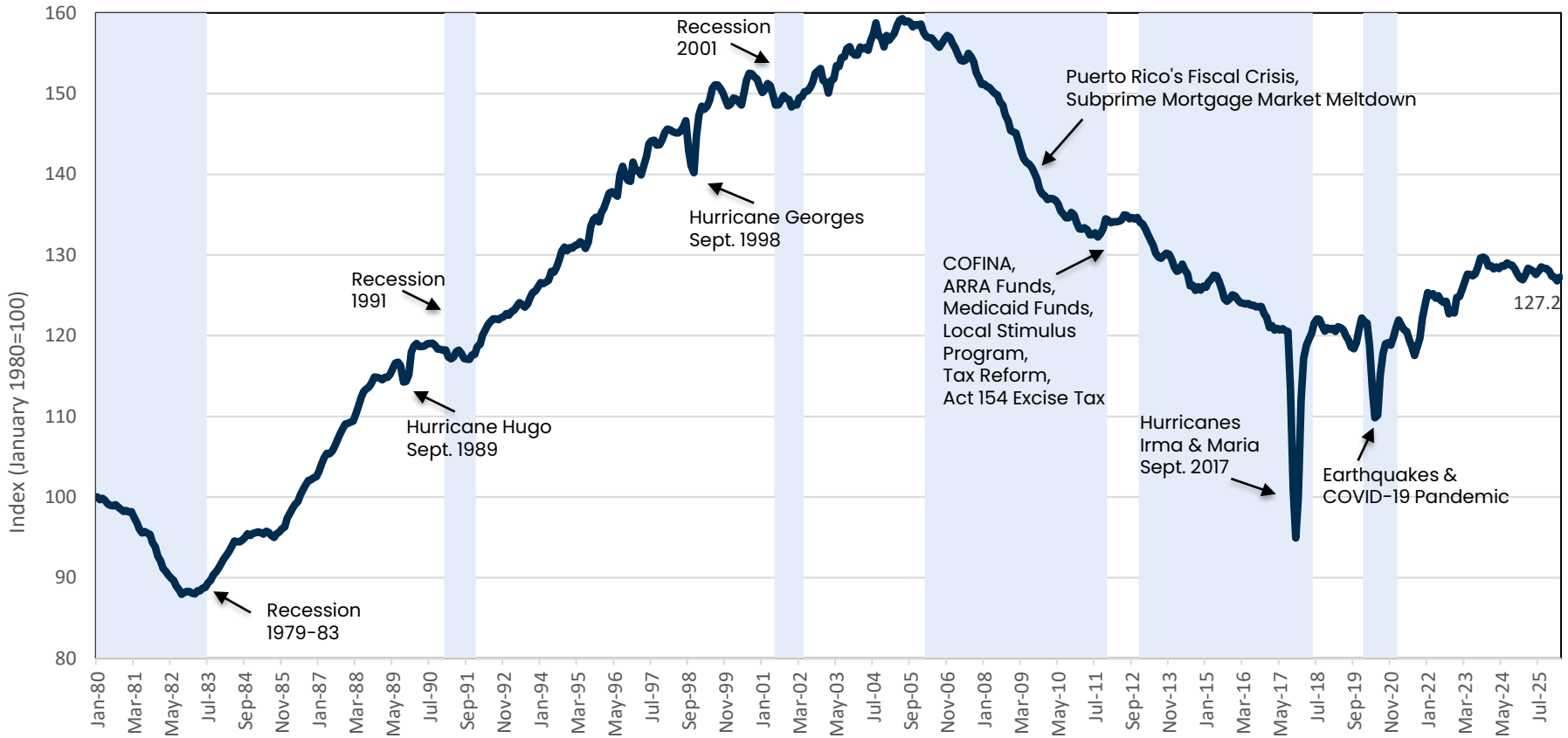
Results: movement through time

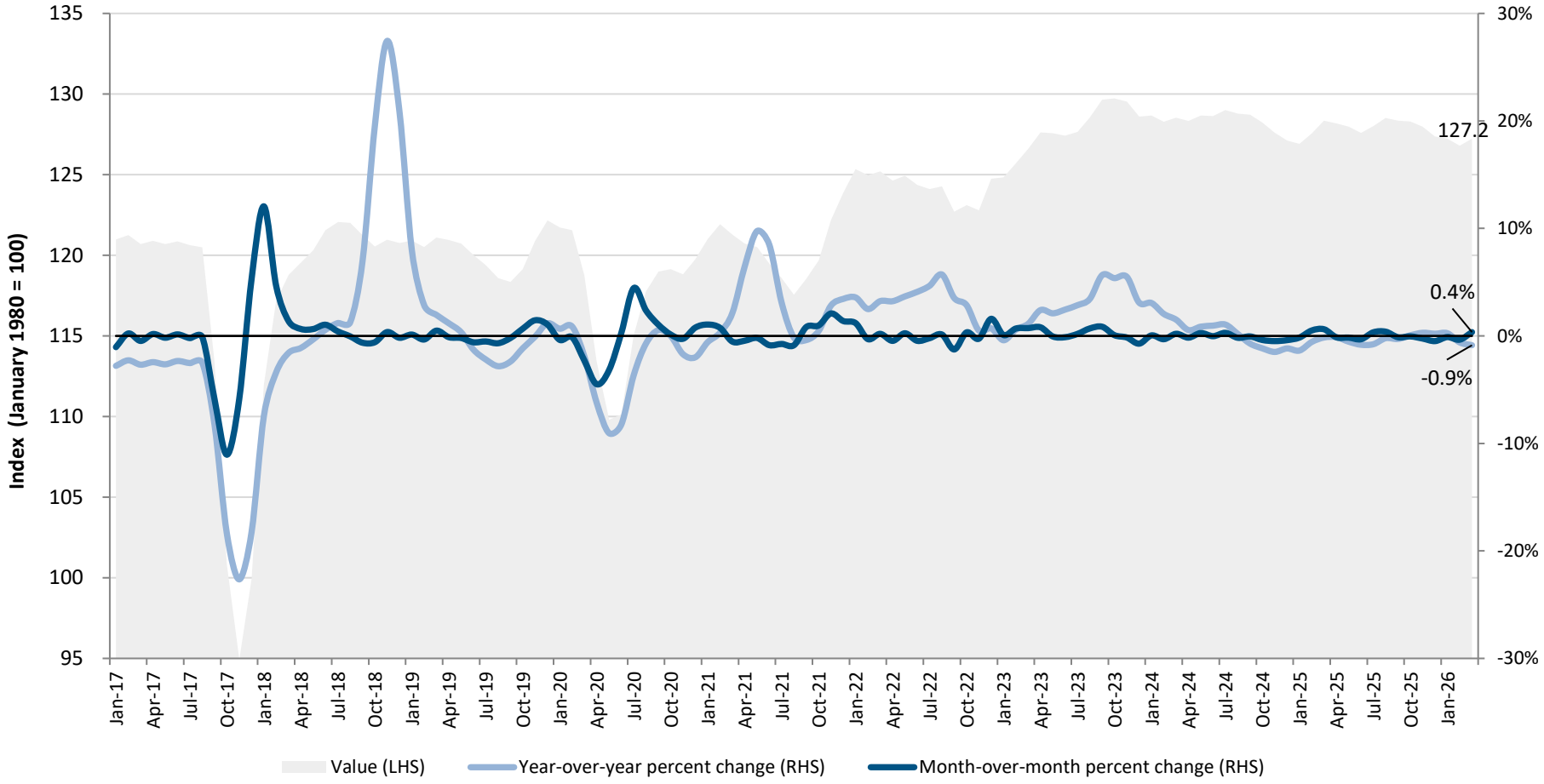
1. The growth rates of the real GNP estimated with the annual growth of the PR-EAI are relatively close to the actual real GNP rates.
2. During fiscal years 2007-2010 the procedure underestimated real GNP falls.
3. Conversely, for the disaster recovery period of hurricanes Irma & María the PR-EAI overestimated real GNP rise.



PR-EAI since January 1980



PR-EAI since January 2017



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She joined the Government Development Bank of Puerto Rico (GDB) in September 1986. Her primary responsibilities pertain to the Puerto Rico macroeconomic insights and to special reports and projects that utilize the macroeconomic statistics. Mrs. Medina was the technical lead on the Macroeconomic Analysis Division, coordinating and contributing to the development of scenarios and supporting products for the analysis of the economy of Puerto Rico. She became a member of the National Association of Business Economics and the American Economic Association. Mrs. Medina graduated with a Bachelor of Arts degree in Economics in 1986 from the University of Puerto Rico, where she went on and completed coursework towards a Master of Arts degree in Economics in 2016.