



# Default Rate Prediction Exercise

Grant Thornton

**XVIII Modelling Week**

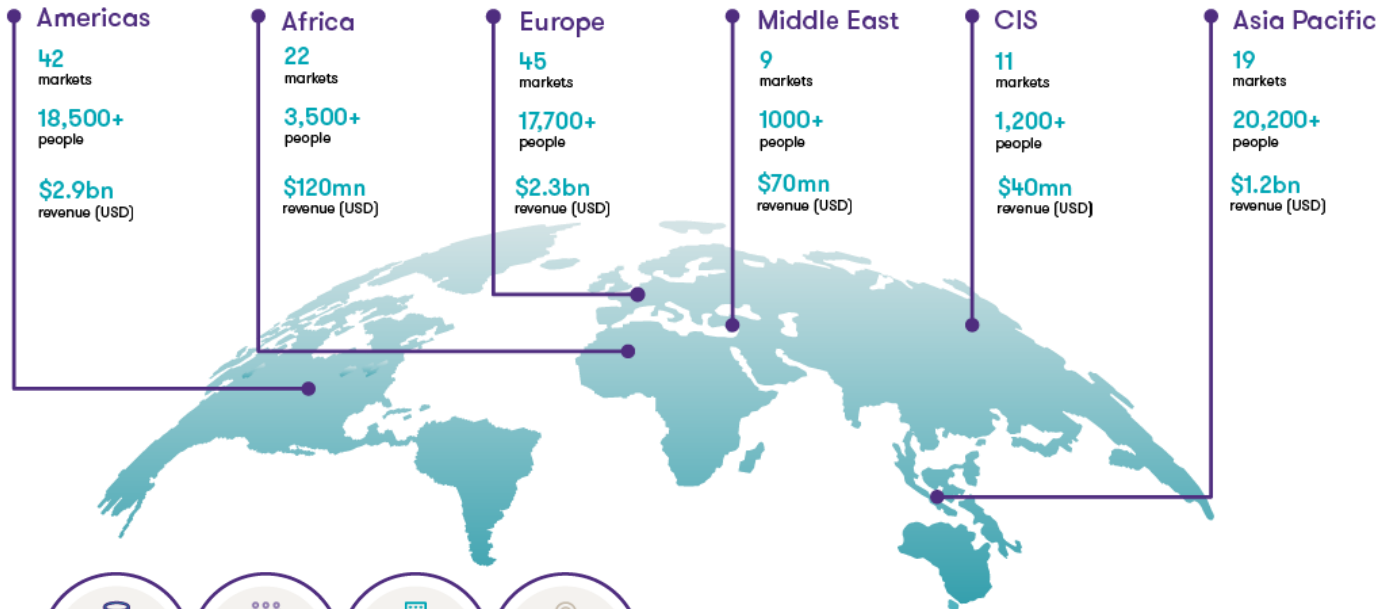
Facultad de Ciencias Matemáticas

Universidad Complutense Madrid

# About Grant Thornton

## Global Expertise, Local Knowledge

Grant Thornton Ireland is the global leader for Quantitative Risk activities in the GT network. We have established ourselves as the global hub and key point of contact for the region. We work on a global team basis with the US and the UK and we have established formal Joint Ventures with Spain, key Central European locations and Cyprus to support the European work and network.



- Our team is the global hub for Quantitative Risk in the Grant Thornton International network and is the largest team of its type in Ireland.
- This includes access to a continually expanding network 100+ quantitative risk experts across direct Joint Ventures in Ireland, Spain, Cyprus and Central Europe, as well as access to the wider network in key financial centres such as London, Frankfurt and New York.
- We are embedded in some of Europe's largest banks providing model development and validation, complex analytics and valuations services.
- We are also a key supplier of services to the European Central Bank in On-site Inspections, Internal Model Investigations and Asset Quality Reviews.



Serving prominent International Significant Institutions and Regulators

# 93%

of the Forbes 100 are clients of Grant Thornton member firms

Our clients include some of the world's leading Financial institutions, including the Forbes 100 and smaller emerging disruptors.



# Quantitative Risk Offering

## Our “Core” Services and Recent Credentials

We provide **strategic advisory** as well as **end to end delivery** services across **all lines on defense**. The core of our services fall under the quantitative risk area covering **Data Analytics, Credit and Market Risk quantification and management, Stress Testing and Forecasting, Climate & Environmental Risk and IT & Cyber**. We work with large international financial institutions and our team is one of the **top providers for ECB OSI and IMI missions**.

### All Lines of Defence

### Our Core Services

### We Deliver Impact



Development



Validation



Audit & Assurance



Regulatory Support

#### What can we offer?

- Our **regulatory experience** being top provider for **ECB OSI and IMI missions**
- Experience based on the **key project we have delivered globally**
- Best in Class **Subject Matter Experts**
- Off-the-Shelf **Tools and Advanced IT Solutions**



#### How Can we help?

- Prepare bank for **OSI / IMI missions**
- Deliver **regulatory approved models** and robust risk frameworks
- Prepare the **Validation framework** in line with regulatory expectations
- Improve Bank Infrastructure**

#### Regulatory Support:

- One of the top service providers for **ECB On Site Inspection projects** across Europe
- We have supported over **35 missions** in last 2 years across **all key risks areas**.

#### 1<sup>st</sup> Line – Model Development

- Numerous **successful IRB and IFRS9 model submissions and regulatory approvals**.
- Significant **regulatory obligations remediation experience**.

#### 2<sup>nd</sup> Line – Validation

- We have implemented our **internal validation framework** on numerous validation projects across range of the risk areas

#### 3<sup>rd</sup> Line – Validation

- Our team is the **center of excellence** for GT Global network which gives us unique global insights auditing the models globally.

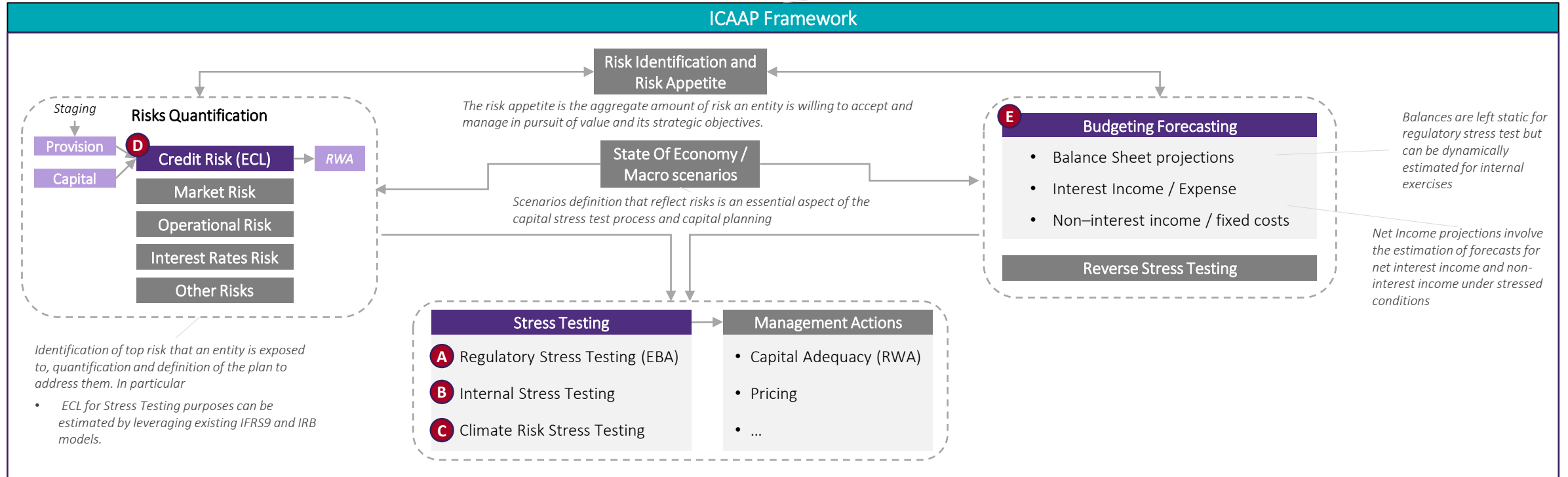
We can help you to deliver more efficient risk management and cost optimisation

# Stress Testing Schema

## Key stress testing components and dependencies within bank ICAAP process

The schema below outlines key different stress test and forecast components within the bank ICAAP process. The design or review of stress testing framework should take into consideration consistency between different forecasting areas in the bank. At the same time bank should ensure the consistency of macroeconomic environment and scenarios used within different parts of the ICAAP or Risk Quantification framework.

*Stress Testing is one of the key components of ICAAP framework (EBA/GL/2016/10). It covers measures Impact on RWA, Internal Capital and Capital Adequacy*



Regulatory Templates

SREP

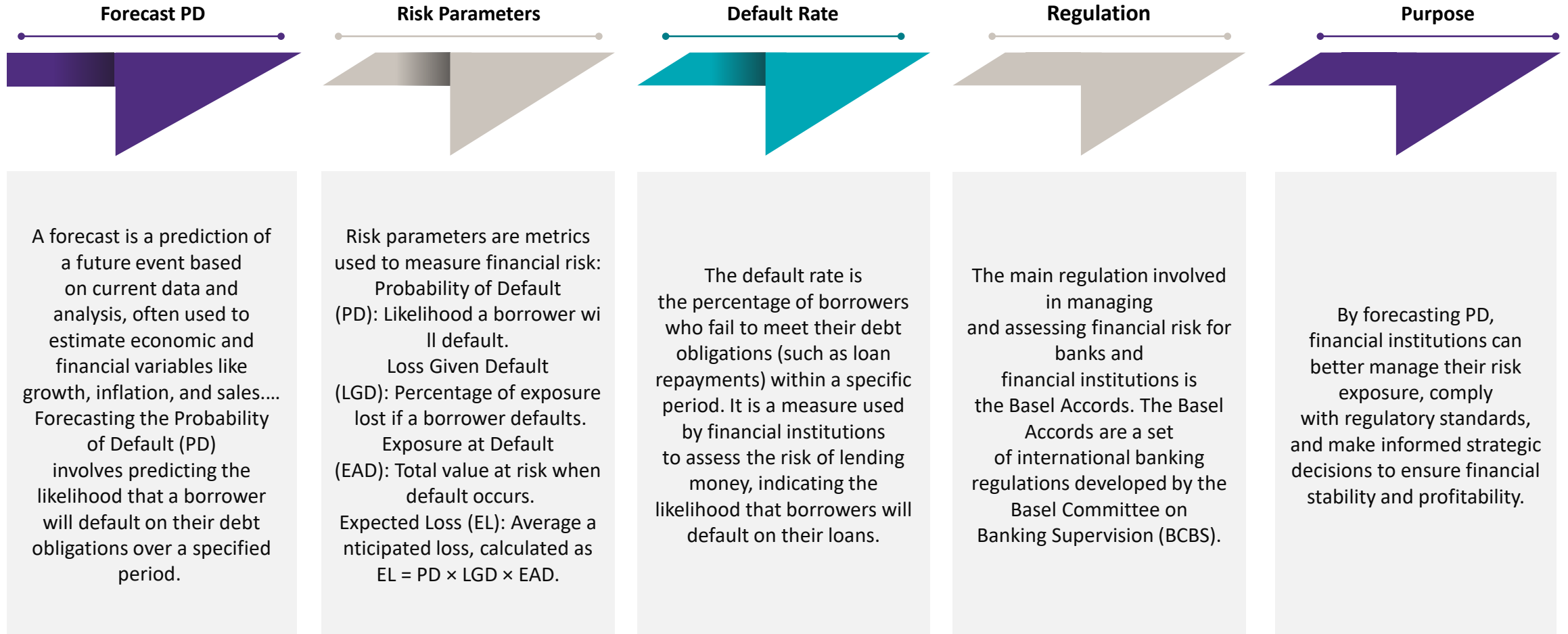
*Building on ICAAP results assesses sustainability of bank model, SREP includes stress testing to gauge how well a bank can withstand adverse scenarios, economic downturns, and other stress conditions*

Supervisory Assessment

# Default Rate Forecast

## General Concepts

To forecast the default rate scenarios is important to understand the main definition that will be used.



# Default Rate Forecast for the purpose of Stress Testing

## Stages expected to be performed

To forecast the default rates for the next 3 years as the 12-months default (+90 days past due). Forecast will be made under two economic scenarios: baseline and severe (conditions / characteristics for these scenarios will be done by Grant Thornton).

### Exploratory Data Preparation and Analysis



- Load and clean data needed for analysis.
- Perform exploratory analysis to understand trends and patterns.

### Modelling (ARIMAX)

- Transform historical data into time series suitable for modelling.
- Integrate macro variables as exogenous variables in the model.
- Fit the model using the historical data and validates its performance.



### Default Rate Forecasting



- Use the adjusted model to predict default rates for the next 3 years.
- Make these predictions for both baseline and severe scenarios, using projections of macro-variables corresponding to each scenario.

### Outcome Analysis

- Perform analysis on the correlations between macro-variables.
- Analyze how default rates vary between the baseline and severe scenarios.
- Identify which macro-variables have the greatest impact on default rates.



### Report and Recommendations

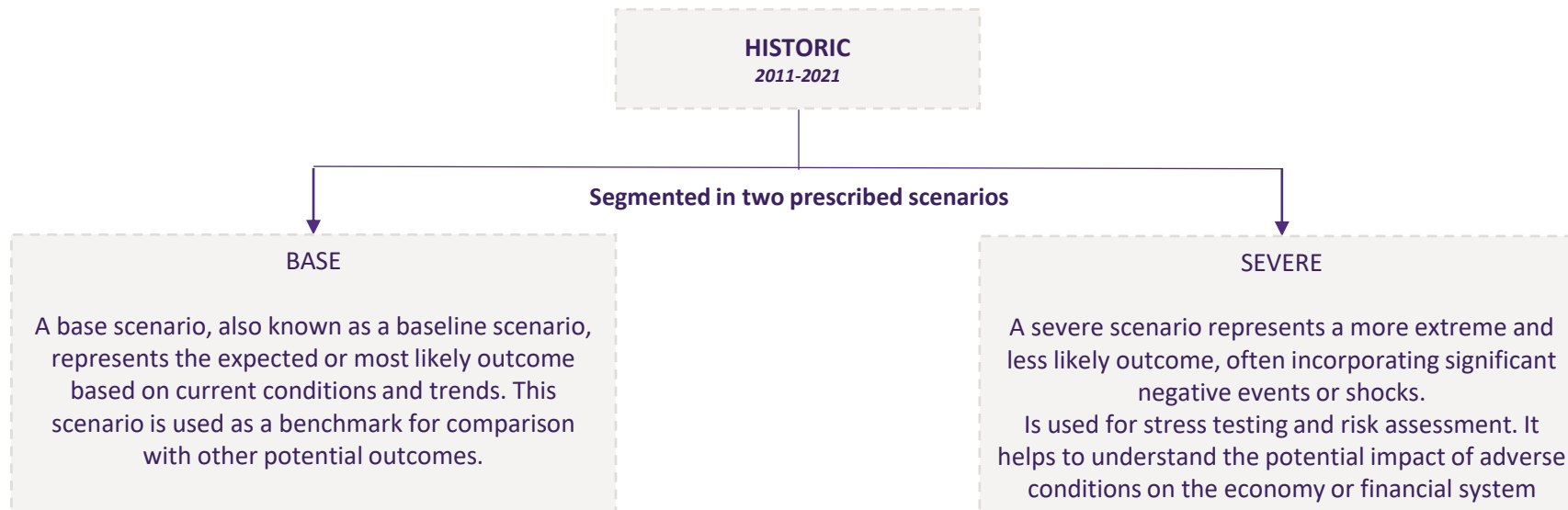
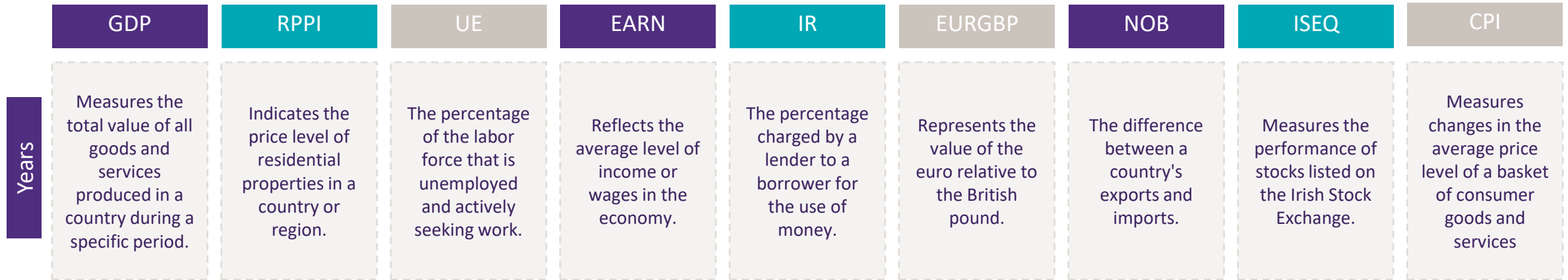


- Prepare a report detailing the modelling process, the predictions obtained, and a comparative analysis of the scenarios.
- Include recommendations based on the findings on how financial institutions can prepare for possible increases in default rates under the severe scenario and regulatory impact: i.e. Expected credit losses / Capital requirements increase.

# Data Base

## Data Breakdown and Default Rate Projection

Students will gain insights into economic dynamics with comprehensive data analysis and scenario projections, enabling informed decision-making and preparedness for future trends. Dataset presented contains the following macro-economic variables.



# Forecast

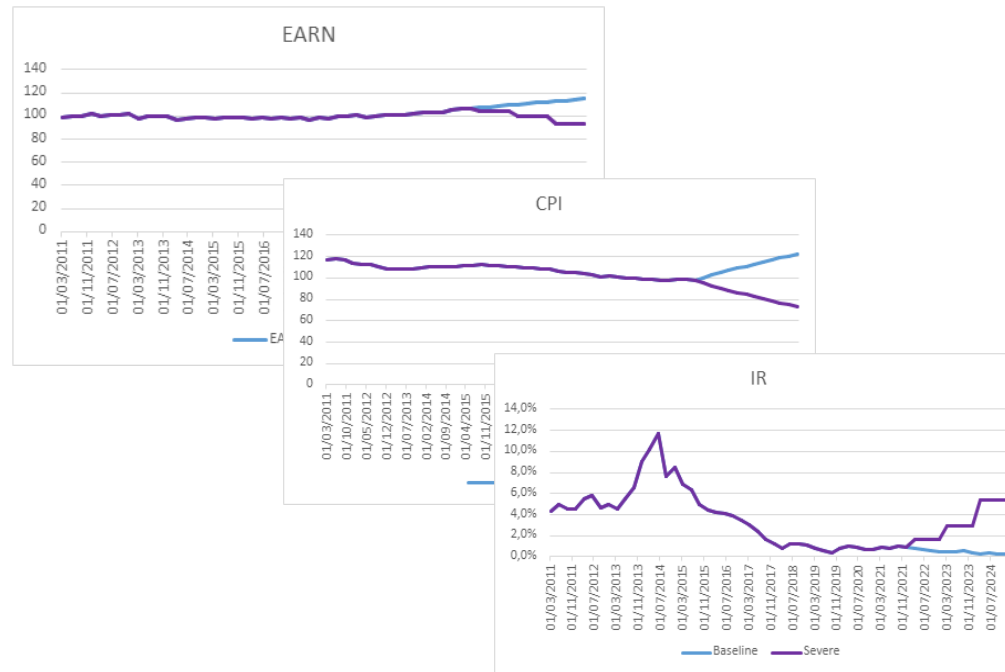
## Projections and Report

Implement a modeling technique in order to get an output for a robust time series forecast that will be aligned to considerable macroeconomic trends. Perform analyses on the macro variables, how default rates vary between the baseline and severe scenarios. After that, prepare a report detailing the modelling process, the predictions obtained, and a comparative analysis of the scenarios.

### Modelling Techniques

- ARIMA Models: Identifying the model parameters.
- Linear Regression Models: Simple and Multiple Linear Regression.
- Time Series Decomposition: Classical decomposition methods, Hodrick-Prescott Filter.
- ARIMAX: Arima model with exogen variables

### Forecast and outcome Analysis



### Report and Recommendation

- Key Outcomes: Summarize the main predictions derived from the model.
- Scenario Analysis: Compare the two types of scenarios.
- Important Metrics: Focus on significant metrics.
- Provide recommendations based on the findings to prepare for potential increases in default rates.

Modelling  
Report  
Analysis



# Our Team

Will support students throughout the entire week



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# Thank you

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