* + Web Integration
  + Project Demonstration & Documentation

### Business Requirements

The business requirements for analyzing the performance and efficiency of banks  in world include identifying KPIs, comparing performance across different countries and states, identifying patterns and trends over time, identifying affecting factors, creating interactive dashboards and reports, identifying areas for improvement, making data-driven decisions, comparing to the industry average and creating forecasting models for future performance. The ultimate goal is to gain insights and improve performance through data visualization techniques

## Introduction

A well-functioning financial system is a prerequisite for economic growth and serves as the backbone of economic development. The amount of funds available in the market depends on the banking skill of converting excess funds into placements, that is, their efficiency (Barth et al. [2013](https://jfin-swufe.springeropen.com/articles/10.1186/s40854-022-00412-y#ref-CR8)). The strength of the banking system is crucial for safeguarding the interests of investors, individuals, and the financial market altogether (Bouheni et al. [2014](https://jfin-swufe.springeropen.com/articles/10.1186/s40854-022-00412-y#ref-CR14)). Financial intermediaries play an important role in the functioning of any modern economy. As the lack of financial supervision eventually results in the spread of systemic risk (Kou et al. [2019](https://jfin-swufe.springeropen.com/articles/10.1186/s40854-022-00412-y#ref-CR36)), strong banking regulation and supervision create a stable and safe banking environment aimed at preventing the negative impact that a bank failure can have on the entire economy. However, the impact of the banking regulatory framework remains a thought-provoking research topic as its refinements and changes have significant r on bank performance. The database of EU commercial banks from 28 countries during the period from 2006 through 2015 serves as a valuable and unique pool, as it includes the introduction of the two largest regulatory changes in banking, namely Basel II and Basel III. The empirical analysis is conducted in two stages: the results for relative efficiency are obtained using non-parametric data envelopment analysis (DEA), whereas the effects of bank-specific and macroeconomic variables, along with regulatory framework changes on profitability and efficiency, are examined using dynamic panel data analysis. Only a few authors have used a similar approach to analyze the impact of regulations on bank profitability and efficiency. However, while analyzing the impact of regulation on bank performance, the authors examine the impact of introducing only one major regulatory framework (Pasiouras et al. [2009](https://jfin-swufe.springeropen.com/articles/10.1186/s40854-022-00412-y#ref-CR48); Bouheni et al. [2014](https://jfin-swufe.springeropen.com/articles/10.1186/s40854-022-00412-y#ref-CR14); Căpraru and Ihnatov [2014](https://jfin-swufe.springeropen.com/articles/10.1186/s40854-022-00412-y#ref-CR16)).

This study aims to examine the impact of the introduction of two major regulatory changes (Basel II and Basel III) on bank performance over a longer observation period with respect to bank size and bank-specific and macroeconomic variables. Furthermore, most studies use arbitrary criteria to select the sample by country of origin (Bouheni et al. [2014](https://jfin-swufe.springeropen.com/articles/10.1186/s40854-022-00412-y#ref-CR14); Căpraru and Ihnatov [2014](https://jfin-swufe.springeropen.com/articles/10.1186/s40854-022-00412-y#ref-CR16)) and distinguish banks by size (Terraza [2015](https://jfin-swufe.springeropen.com/articles/10.1186/s40854-022-00412-y#ref-CR61)). We use the European Central Bank (ECB) methodology as a more objective criterion for classifying bank size and focus on the analysis of EU banks as they are required to follow the same directives set out by the EU Commission.

The empirical analysis is conducted for different bank size categories to determine whether there is a difference in the impact of regulatory changes and other determinants on bank performance, that is, profitability and relative efficiency. The obtained results indicate, among other things, that larger banks have successfully adapted to the new regulatory framework, whereas small banks have experienced a decline in their performance, suggesting that bank regulation should be size-dependent. When introducing new regulatory frameworks, small and large banks should be distinguished to maintain a reasonable level of competition.

To the best of the authors’ knowledge, there is no study on the impact of EU regulations (derived from Basel II and III) for the entire sample of the member countries of the EU. Although the existing literature extensively analyzes the profitability and efficiency determinants in the banking sector, only a few studies have examined the impact of regulation along with bank-specific and macroeconomic variables in relation to different bank size categories (Terraza [2015](https://jfin-swufe.springeropen.com/articles/10.1186/s40854-022-00412-y#ref-CR61); Triki et al. [2017](https://jfin-swufe.springeropen.com/articles/10.1186/s40854-022-00412-y#ref-CR62)). It is safe to attribute this to the short observation period and difficulties in defining the proxies for the new regulation as well as the proxies for the bank size groups.

Regarding these issues, this study’s contribution to the existing body of literature is to fill the gap by examining the impact of regulation along with bank-specific and macroeconomic variables on the performance of banks operating in 28 EU countries.

This paper proceeds as follows. "[Supervision of commercial banks in the European Union](https://jfin-swufe.springeropen.com/articles/10.1186/s40854-022-00412-y#Sec2)" section discusses the supervision and structure of commercial banks in the EU. "[Literature review](https://jfin-swufe.springeropen.com/articles/10.1186/s40854-022-00412-y#Sec3)" section reviews the literature on the relative efficiency and profitability of commercial banks. "[Methodology, sample characteristics, and variable selection](https://jfin-swufe.springeropen.com/articles/10.1186/s40854-022-00412-y#Sec4)" section describes the methodology, sample characteristics, and variable selection. "[Empirical results](https://jfin-swufe.springeropen.com/articles/10.1186/s40854-022-00412-y#Sec8)" section elaborates on the empirical results and provides an economic interpretation. [Concluding remarks](https://jfin-swufe.springeropen.com/articles/10.1186/s40854-022-00412-y#Sec9) Section further draws conclusions, discusses the study implications, and provides recommendations for future research.