**Ministerul Educației și Cercetării al Republicii Moldova**

**Universitatea Tehnică a Moldovei**

**Facultatea Calculatoare, Informatică și Microelectronică**

**Disciplina: Analiza Exploratorie a Datelor**

**RAPORT**

**Lucrarea de laborator nr. 1**

**Tema:** European Development Indicators

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**Assignment 1: European Development Indicators**

**Phase 1: Country Selection & Data Acquisition**

**Chosen Country**

For this project, the selected European country is Latvia (LV). Latvia represents an interesting case for economic analysis due to its relatively small and open economy, strong dependence on trade and transport flows, and demographic challenges such as migration and population decline. The country’s integration into the EU single market and its adoption of the euro have also made it highly sensitive to regional and global economic dynamics.

**Research Questions**

The following research questions (RQ) have been defined to explore the economic relationships and structural dynamics in Latvia using quantitative indicators from Eurostat and the World Bank:

**RQ1**: How has the evolution of external trade and passenger flows correlated with Latvia’s GDP and overall economic activity?

**RQ2**: What is the relationship between unemployment, migration, and international departures of Latvian residents?

**RQ3**: How do freight and passenger transport volumes relate to inflation?

These questions aim to go beyond simple descriptive analysis and investigate the interconnections between trade, mobility, and macroeconomic performance over time.

**3. Selected Indicators (Eurostat / World Bank)**

To address the above research questions, a set of 15 indicators was selected, primarily from Eurostat, with one (Net migration) sourced from the World Bank.

The selected indicators cover macroeconomic, demographic, and transport dimensions, allowing for a comprehensive cross-domain analysis.

**Selected indicators**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **№** | **Code** | **Indicator Name** | **Source** | **Frequency/**  **Coverage** | **Justification** |
| 1 | namq\_10\_gdp | Gross Domestic Product | Eurostat | Quarterly  (1975-2024) | Core indicator for economic performance, used as reference for most analyses. |
| 2 | prc\_hicp\_manr | Inflation (HICP, monthly rate) | Eurostat | Monthly  (1997-2025) | Captures price dynamics and cost pressures relevant to economic activity. |
| 3 | une\_rt\_m | Unemployment rate | Eurostat | Monthly  (1983-2025) | Reflects labor market performance and social stability. |
| 4 | lfsi\_emp\_q | Employment | Eurostat | Quarterly  (2003-2025) | Complements unemployment data and supports labor productivity analysis. |
| 5 | avia\_paocc | Air passenger transport | Eurostat | Monthly (1993-2025) | Represents international mobility, complements RQ1. |
| 6 | sts\_inpr\_m | Industrial production index | Eurostat | Monthly (1954-2025) |  |
| 7 | sts\_trtu\_m | Retail trade turnover index | Eurostat | Monthly (1992-2025) |  |
| 8 | tour\_occ\_nim | Tourism nights spent | Eurostat | Monthly (1990-2025) |  |
| 9 | nrg\_pc\_202 | Energy consumption per capita | Eurostat | Semestrial  (2007-2025) | Proxy for energy efficiency and economic intensity. |
| 10 | nama\_10\_exi | Exports and imports by counterpart area | Eurostat | Annual  (1975-2024) | Measures external trade performance, crucial for RQ1. |
| 11 | migr\_emi1ctz | Emigration of citizens | Eurostat | Annual  (1998-2023) | Captures international departures of Latvian residents (RQ2). |
| 12 | road\_pa\_mov | National passenger road transport performance | Eurostat | Annual  (1970-2025) | Represents internal passenger mobility (RQ1 and RQ3). |
| 13 | tran\_hv\_frtra | Heavy vehicle freight transport | Eurostat | Annual  (2005-2023) | Measures freight volumes, relevant for RQ3. |
| 14 | SM.POP.NETM | Net migration | World Bank | Annual  (1960-2024) | Indicates demographic balance and migration trends (RQ2). |
| 15 | demo\_pjan | Population on 1 January | Eurostat | Annual  (1960-2024) | Used to normalize other indicators (per capita, rates). |

This selection ensures a balanced dataset across economic, demographic, and transport sectors, aligned with the research focus.

**Data Sources and Acquisition Approach**

Primary source: **Eurostat** — official statistical database of the European Union.

Secondary source: **World Bank Open Data** — for the Net Migration indicator, which is not available in Eurostat.

Data were collected using a Python script (/scr/coolecting\_data.py) that automates dataset retrieval via the eurostat Python package.

Each dataset was downloaded and stored in the /data/raw/ directory for reproducibility.

The script automatically retrieves the most recent and complete series available for each indicator.

The indicator SM.POP.NETM) was downloaded manually from the World Bank portal in CSV format (<https://data.worldbank.org/indicator/SM.POP.NETM>).

**Data Frequency and Coverage**

The selected indicators cover a time span from approximately 1995–2024, depending on data availability.

At least half of the dataset consists of monthly or quarterly frequency indicators (GDP, inflation, unemployment, employment), satisfying the project’s frequency requirement.

All indicators have been verified for Latvia (geo = LV) only, ensuring country-level consistency.

**Concluzii**

În urma efectuării lucrării de laborator nr. 1 s-au analizat două scheme echivalente ale canalelor de comunicare in cod serie si cod parallel. În rezultatul simulărilor effectuate s-a observant:

1.

2.

3.