

ESTIMATING THE IMPACT OF FOREIGN DIRECT INVESTMENT (FDI) ON UNEMPLOYMENT IN MENA COUNTRIES USING PANEL DATA IN STATA

1. Background and Problem Statement

Many Middle East and North African (MENA) countries have actively promoted foreign direct investment (FDI) as a strategy for economic development and job creation. However, concerns remain about whether FDI inflows have effectively translated into lower unemployment rates in the region. Policymakers needed empirical evidence to determine if sector-specific or country-level FDI inflows are associated with improvements in employment.

To address this, a regional economic research agency commissioned a panel data econometric analysis using Stata. The objective was to analyze the relationship between FDI inflows and unemployment rates across 10 MENA countries over a 20-year period, while accounting for differences in governance, education, and economic openness.

2. Objectives

- To quantify the impact of FDI on unemployment across MENA countries from 2000 to 2020
- To distinguish effects by sector-specific FDI (manufacturing, services, energy)
- To control for governance quality, education level, and economic openness
- To determine whether the effect of FDI on unemployment varies by institutional quality
- To provide econometric evidence for regional FDI and labor market policy formulation

3. Methodology

3.1 Dataset Description

- **Countries:** 10 MENA countries (e.g., Egypt, Jordan, Morocco, Tunisia, Saudi Arabia)
- **Time Frame:** 2000–2020 (balanced panel)
- **Key Variables:**
 - unemp_rate (dependent variable) – total unemployment rate (% of labor force)
 - fdi_gdp – FDI inflows as % of GDP

- gov_effect – governance effectiveness (World Bank WGI)
- edu_index – average years of schooling
- open_index – trade openness (exports + imports as % of GDP)
- fdi_sector_manu, fdi_sector_serv, fdi_sector_energy – sectoral FDI inflows

3.2 Data Cleaning and Processing

- Checked for missing values and used linear interpolation for intermittent gaps
- Applied logarithmic transformation for skewed continuous variables
- Created interaction terms: $\text{fdi_gdp} \times \text{gov_effect}$ and $\text{fdi_sector_serv} \times \text{edu_index}$

3.3 Econometric Modeling

- **Fixed vs. Random Effects Models:** Estimated using xtreg with Hausman test to select the preferred model
- **Robustness Checks:**
 - Clustered standard errors by country
 - Multicollinearity tested using vif
 - Serial correlation tested via Wooldridge test
 - Heteroskedasticity tested using modified Wald test
- **Interaction Model:** Estimated marginal effects of FDI conditional on governance quality
- **Panel Granger Causality Test:** To assess directional causality between FDI and unemployment

4. Key Results

- **Hausman Test:** Preferred Fixed Effects model ($p < 0.05$)
- **Model Fit:** R^2 (within) = 0.48
- **Direct Impact:**
 - fdi_gdp: Coefficient = -0.83 , $p < 0.01$ → higher FDI associated with lower unemployment
 - gov_effect: Coefficient = -1.07 , $p < 0.05$ → better governance reduces unemployment
 - edu_index: Coefficient = -0.58 , $p < 0.10$ → marginally significant effect

- **Interaction Effect:**
 - $\text{fdi_gdp} \times \text{gov_effect}$: Negative and significant $\rightarrow$ FDI reduces unemployment more effectively in countries with higher governance quality
- **Sector-Specific Findings:**
 - fdi_sector_manu : Significant negative effect
 - fdi_sector_serv : Insignificant
 - fdi_sector_energy : Positive effect, suggesting jobless growth in extractive sectors
- **Granger Causality:** Bidirectional causality between fdi_gdp and unemp_rate ($p < 0.05$)

5. Interpretation and Insights

- FDI plays a statistically significant role in reducing unemployment in the MENA region, but its effectiveness is conditional on governance and sectoral targeting.
- The benefits of FDI are more pronounced in manufacturing than in energy or services.
- Poor governance diminishes the employment potential of FDI inflows, highlighting the need for institutional strengthening.
- Education complements FDI in the services sector, though the results were less robust, suggesting the need for skill-aligned FDI attraction policies.

6. Recommendations

- Target FDI policies toward manufacturing sectors, which have stronger employment linkages
- Strengthen governance mechanisms to improve the labor market impact of foreign investments
- Foster education-FDI alignment in the services sector through skill development programs
- Implement sector-specific incentives to attract job-creating FDI rather than capital-intensive investments
- Establish a regional FDI monitoring dashboard tracking labor outcomes by sector and governance indicators

7. Deliverables

- Panel dataset in .dta format with derived variables and transformations
- .do file with all regression models, diagnostics, and fixed effects output
- Full APA-formatted econometric report (6 pages + appendix)
- Excel summary dashboard highlighting sectoral FDI trends vs unemployment rates
- Graph pack (PDF + PNG) showing interaction plots, coefficient estimates, and model diagnostics

8. Stakeholder Relevance

Academic:

- Case study for panel econometrics, institutional interaction models, and regional development analysis
- Can be integrated into advanced econometrics coursework or thesis projects

Government and Policy:

- Informs FDI targeting strategies within national development plans
- Evidence for policy debates on sectoral prioritization and institutional reform

Development Sector and NGOs:

- Supports evaluation of employment-focused investment programs in MENA
- Useful for donor agencies advocating for inclusive economic growth