Group 1 - Research Objectives Questions

Master's in Business Analytics – Culminating Project
Week of: 5
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Research Objective 1: Determining the Trends and Most Important Factors of Life Expectancy at Birth

Indicator Groups to Use: SPIIndicator, WDIEconomicIndicator, WDIEnvironmentIndicator, WDIHealthIndicator, WDISocialIndicator

Research Questions:

1. How has Life Expectancy at Birth changed over time for each country? How about when aggregated by different regions or by different income groups?
2. Which time series model would best forecast this number in the next 10 years?
3. What machine learning models best predict this indicator?
4. After determining the most significant indicators related to life expectancy at birth, what does cluster analysis by these indicators reveal?
5. How do education indicators relate to total unemployment and can a model be built to predict total unemployment using only these indicators?
6. How do black box models vs more interpretable models perform? What are the utility trade offs between them?

Research Objective 2: Determining the Trends and Most Important Factors of Total Unemployment / Labor Force Participation Rate

Indicator Groups to Use: SPIIndicator, WDIEconomicIndicator, WDIEnvironmentIndicator, WDIHealthIndicator, WDISocialIndicator, WDIPrivateSectorIndicator, WDIPublicSectorIndicator, WDIFinancialSectorIndicator

Research Questions:

1. How has total unemployment changed over time for each country? How about when aggregated by different regions or by different income groups?
2. Which time series model would best forecast this number in the next 10 years?
3. What machine learning models best predict this indicator?
4. After determining the most significant indicators related to total unemployment, what does cluster analysis by these indicators reveal?
5. How do education indicators relate to total unemployment and can a model be built to predict total unemployment using only these indicators?
6. How do black box models vs more interpretable models perform? What are the utility trade offs between them?

Research Objective 3: Political Stability and Economic Performance

Political_Stability_Economic_Performance.csv

Research Questions:

1. How does political stability impact economic growth over time? (Time Series Analysis)
2. Does political stability significantly impact government spending on social services?
3. Can a machine learning model predict a country's risk of economic downturn based on political factors? (Random Forest)
4. Is there a significant difference in GDP growth rates between politically stable and unstable countries? (T-Test)
5. Can we predict the likelihood of economic crises based on political indicators? (Neural Networks)
6. How does political instability affect foreign exchange rate fluctuations? (Time Series Analysis)

Research Objective 4: Social Development and Economic Development

Social_Development_Economic_Performance.csv

Research Questions:

1. How does government expenditure on education and healthcare impact life expectancy?
2. Does an increase in employment rates significantly impact GDP growth? (F-Test)
3. Can a machine learning model predict a country's life expectancy based on economic and social indicators? (Random Forest)
4. Is there a relationship between education levels and labor market participation rates? (Chi-Square Test)
5. Can we forecast improvements in social development using historical trends? (Time Series Analysis)
6. How does access to financial services impact income growth and poverty reduction?

Research Objective 5: Impact of governance indicators, economic performance and gender equality on education

School_enrollment.xlsx

Research Questions:

1. Is there a significant difference in school enrollment rates between countries with high and low governance scores?
2. Do countries with higher female representation in government have better female school enrollment rates?
3. Does GDP per capita have a significant effect on primary and secondary school enrollment?
4. Is there a correlation between gender equality indicators and female school enrollment?
5. Are countries with higher gender parity in education more likely to have higher economic growth rates?
6. How have gender equality metrics evolved alongside school enrollment in low-income countries?

Research Objective 6: Impact of Population Growth and GDP on Unemployment

PopulationGrowth_GDP_Unemployment.xlsx

Research Questions:

1. Do developing countries show higher unemployment under high population growth compared to developed countries?
2. How has unemployment changed over the last 20 years in countries with rapid population growth?
3. How does unemployment differ between high-GDP and low-GDP countries?
4. Can unemployment rates be predicted based on population growth and GDP?
5. Using historical data, can we forecast future unemployment trends for countries with different population growth rates?
6. Which variable—population growth or GDP—has a stronger impact on predicting unemployment?
7. Is the impact of population growth on unemployment increasing or decreasing over time globally?

Research Objective 7: To investigate if the age at which children begin primary school influences various aspects of the labor market. Segregating results by male/female is optional. A variation of this objective could focus on primary school duration.

Research Questions:

1. Can countries be classified into distinct groups based on their primary school starting age and the structure of their labor markets (e.g., agricultural vs. industrial vs. service-based)?
2. Does a later primary school starting age correlate with a higher likelihood of a country being classified as having a more developed and less vulnerable labor market?
3. Do countries with similar primary school starting ages cluster together in terms of unemployment rates, female labor force participation, and economic development?
4. Are there identifiable clusters where a later starting age correlates with lower unemployment, greater gender parity in the workforce, and higher GDP per capita?
5. Is there a significant correlation between primary school starting age and the overall employment-to-population ratio?
6. How does primary school starting age correlate with the prevalence of wage and salaried employment versus contributing family work, which may indicate the quality of employment?
7. Does primary school starting age significantly predict youth unemployment rates, controlling for secondary education duration and GDP per capita?
8. How much of the variance in youth unemployment can be explained by primary school starting age, considering the length of secondary education and economic development?
9. How has the relationship between primary school starting age and the sectoral composition of the labor market (agriculture, industry, services) evolved over time within specific countries?
10. Are there time lags between changes in primary school starting age and observable shifts in labor force participation and the distribution of employment across different sectors?

Research Objective 8: To investigate female labor participation to determine if there are any actionable insights to recommend to world leaders

Research Questions:

1. Can countries be classified into economic structures based on female employment distribution across agriculture, industry, and services?
2. Do more developed economies show higher female participation in services rather than industry or agriculture?
3. Can countries be categorized based on governance quality and female labor force inclusion?
4. Do stronger governance frameworks lead to lower female unemployment rates?
5. Are there clusters of countries with distinct female employment sectoral trends?
6. How do economic diversification and sectoral employment shifts impact female employment?
7. Are there clusters of countries where high governance effectiveness aligns with higher female workforce participation?
8. How do governance-driven labor markets differ in female employment stability?
9. Is higher GDP per capita correlated with a shift from agriculture to services in female employment?
10. Does economic growth impact female labor force transitions across sectors?
11. Is stronger governance effectiveness correlated with higher female labor force participation?
12. Does political representation of women impact female wage employment levels?
13. How does governance effectiveness impact female labor force participation?
14. Does increasing women's political representation drive female employment?
15. Does economic growth predict female employment shifts toward services?
16. How do industry and agriculture employment influence service sector employment for women?
17. How has governance effectiveness influenced female labor force participation over time?
18. Is there a lag between political representation gains and improved labor force participation?
19. How have female employment patterns across economic sectors evolved over time?
20. Are there economic cycles that drive shifts in female employment between sectors?