Quantitative Strategy Case Study Interview

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Section 1

Question 1 (Data Storytelling)

- Data: Resale flat prices based on registration date from Jan-2017 onwards
- Blog write-up: Draft article on Medium - Are property agents in Singapore a thing of the past?
- Code: question1.ipynb attached on email

Question 2 (Prediction)

- Data: Average Daily Polyclinic Attendances for Selected Diseases
- Code: question2.ipynb attached on email

Question 3
Analysis Plan

Reference: MOM 2022 Comprehensive Labour Force Survey

Case study on the effect of employment type on gross monthly income

Analysis plan to support data request

HR Analytics Team, ABC company

Context

- ABC company is experiencing challenges in workforce planning and employee retention, particularly in understanding compensation discrepancies across different types of employment contracts.
- Senior management has tasked the HR Analytics team to work on a detailed analysis of how various employment types impact gross monthly income.
- This will enable us to make informed decisions on compensation strategies and ensure equity and competitiveness in the job market.

Objectives

Using the 2022 Comprehensive Labour Force Survey (CLFS) conducted by Ministry of Manpower (MOM), identify relevant variables to support in the analysis of the effect of employment type on employees' gross monthly income, with other relevant factors considered.

Proposed methodology

Broad Outline of Analysis to be carried

Analysis	Rationale
Data Cleaning and Preparation	● All personal identifiers anonymized to protect respondent privacy. ● Handle missing data appropriately through imputation or exclusion, depending on the extent of missingness.
Descriptive Statistics	Summarize the data to understand the distribution of gross monthly income across different employment types and other control variables.
Regression Analysis	● Conduct multiple linear regression with gross monthly income as the dependent variable and type of employment as the primary independent variable. ● Include control variables: occupation, industry, highest qualification attained, age, sex, years in current job, and usual hours worked.
Interaction Effects	Explore potential interaction effects between employment type and other variables (e.g., employment type and education level) to understand if the impact of employment type varies across different subgroups
Robustness Checks	Perform sensitivity analyses to check the robustness of the findings. This could include using alternative model specifications or excluding outliers.

Proposed methodology

Broad Outline of Analysis to be carried based on data

1. **Data collection and preparation:** Request meaningful fields to support analysis. Anonymized data is good to ensure privacy. Provided data will be examined and handled for missing values, no-variance fields, outliers, etc.
2. **Data Analysis:**
    - **Descriptive Statistics:** Calculate means, medians, standard deviations, and visualize income distribution.
    - **Correlation Analysis:** Conduct ANOVA to compare income across different employment types.
    - **Regression Analysis:** Multiple regression analysis using dummy variables for employment type and include control variables (those requested data fields other than independent and dependent variables) to isolate the impact on income.
3. **Interpretation & Reporting:**
    - **Coefficient Interpretation:** Determine most significant variables impacting outcome.
    - **Interaction Effects:** Explore interactions between employment type and other variables.
    - **Robustness Checks:** Perform sensitivity analyses to ensure reliability of findings.
    - **Presentation:** Use visuals and presentation deck to summarize and share findings.

Data request (1/2) - For Employed Residents

In Monthly Granularity following Income

Field	Justification
Gross monthly income from work	Main dependent variable. Directly measures the outcome of interest, i.e., the income earned by employees.
Employment type	Main independent variable. Primary variable of interest to determine effect on income.
Occupation	Different occupations have varying pay scales. Including this variable helps control for the effect of job roles on income.
Industry	Industries differ in their average compensation levels. This variable controls for sector-specific income differences.
Highest Qualification Attained	Education level is a significant predictor of income, higher education typically relating to higher incomes. Including this ensures that the analysis accounts for differences in educational background.
Age	Age is often correlated with experience, which can affect income levels. This variable will help control for the effect of work experience.

Data request (2/2)

Field	Justification
Sex	To rule out any gender biases on income across the different employment types
Years in Current Job	Longer tenure in a job can lead to higher income due to promotions and raises. This variable helps control for tenure effects.
Usual Hours Worked	Part-time versus full-time status, as well as overtime work, can significantly influence gross income.
Marital Status	Marital status can influence financial responsibilities and income levels, providing additional context for the analysis.
Field of Study	This can help control for the specific skills and expertise that might influence income, beyond the highest qualification attained.
Willingness and Availability of Part-Timers to Work Additional Hours	This can provide insights into underemployment and its impact on income.
Job Change	Whether the individual has changed jobs recently can impact their income and provide context on job stability

Questions?


Thank
You