



Department of Economics

## Econometric Analysis of Panel Data

Spring 2006 – Tuesday, Thursday: 1:00 – 2:20

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URL for course web page:  
[www.stern.nyu.edu/courses](http://www.stern.nyu.edu/courses)

[www.stern.nyu.edu/~wgreene/Econometrics/PanelDataEconometrics.htm](http://www.stern.nyu.edu/~wgreene/Econometrics/PanelDataEconometrics.htm)

## Final Examination

This is a 'take home' examination. Today is Thursday, April 27, 2006. Your answers are due on Friday, May 12, 2006. You may use any resources you wish – textbooks, computer, the web, etc. – but please work alone and submit only your own answers to the questions.

## Part I. The Hausman and Taylor Estimator

Write out a full statement of the procedure that Hausman and Taylor devised for estimation of the parameters in a panel data model in which some independent variables are correlated with the time invariant part of the disturbance in a random effects model. Now, show how the Arellano/Bond/Bover (A&B - somehow Bover often manages to disappear from the references to this body of work.) uses the Hausman and Taylor result.

## Part II. Panel Data Regressions

Using the Spanish dairy farm data on the course web site, fit pooled OLS, fixed effects and random effects linear regressions models. The central equation for the model is a translog production function

$$y_k = \alpha_0 + \sum_{j=1}^m \beta_j \lambda_{k,j} + \sum_{j=1}^m \sum_{i=1}^n \gamma_{ij} \lambda_{k,j} \lambda_{k,i} + \varepsilon_k$$

( $y_1, x_1, x_2, x_3, x_4$  are already the logs of the output and four inputs.) Test the hypothesis of “no effects” vs. some effects. Then, use the data to decide which is the appropriate estimator for these data, random effects or fixed effects. Note that the data also include six year dummy variables. For the second half of this exercise, extend your model to include a time effect (there are 6 years of data, drop one of them). Interpret the coefficients on the year dummies, report your results, and test the hypothesis that there is no year effect in the model.

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## Snowflake SnowPro Advanced: Data Engineer (DEA-C02) Sample Questions (Q141-Q146):

### NEW QUESTION # 141

You are tasked with loading Parquet files into Snowflake from an AWS S3 bucket. The Parquet files are compressed using Snappy compression and contain a complex nested schema. Some of the columns contain timestamps with nanosecond precision. You want to create a Snowflake table that preserves the timestamp precision. Which COPY INTO statement options and table definition are MOST appropriate?

- A. Table Definition: CREATE TABLE my\_table (ts TIMESTAMP NTZ(9), other\_col VARCHAR); COPY INTO my\_table FROM FILE FORMAT = (TYPE = PARQUET COMPRESSION = AUTO) ON\_ERROR = 'SKIP\_FILE';
- B. Table Definition: CREATE TABLE my\_table (ts VARCHAR, other\_col VARCHAR); COPY INTO my\_table FROM FILE FORMAT = (TYPE = PARQUET COMPRESSION = SNAPPY) ON\_ERROR = 'SKIP\_FILE' = PARSE TIMESTAMP(ts);
- C. Table Definition: CREATE TABLE my\_table (ts TIMESTAMP NTZ(9), other\_col VARCHAR); COPY INTO my\_table FROM FILE FORMAT = (TYPE = PARQUET COMPRESSION = SNAPPY) ON\_ERROR = 'SKIP\_FILE';
- D. Table Definition: CREATE TABLE my\_table (ts TIMESTAMP NTZ(9), other\_col VARCHAR); COPY INTO my\_table FROM FILE FORMAT = (TYPE = PARQUET COMPRESSION = SNAPPY) ON\_ERROR = 'SKIP\_FILE' VALIDATION\_MODE = RETURN\_ERRORS;
- E. Table Definition: CREATE TABLE my\_table (ts TIMESTAMP NTZ, other\_col VARCHAR); COPY INTO my\_table FROM FILE FORMAT = (TYPE = PARQUET COMPRESSION = SNAPPY) ON\_ERROR = 'SKIP\_FILE';

**Answer: A**

Explanation:

The correct approach is to define the timestamp column with TIMESTAMP NTZ(9) to preserve nanosecond precision. Also, setting COMPRESSION = AUTO is a good practice to let Snowflake automatically detect and handle the compression type, even though Snappy is explicitly mentioned. Option A is close, but AUTO compression is preferred for robustness. B would lose precision as timestamp\_ntz defaults to (0), C converts TIMESTAMP to VARCHAR which causes issues with ordering. E will throw errors but does not solve the problem.

### NEW QUESTION # 142

You have an external table named in Snowflake that points to a set of CSV files in an AWS S3 bucket. The CSV files have a header row, and the data is comma-separated. However, some of the files in the S3 bucket are gzipped. You need to define the external table to correctly read both compressed and uncompressed files. Which of the following SQL statements BEST achieves this?

- A. Option C
- B. Option D
- C. Option E
- D. Option B
- E. Option A

**Answer: D**

Explanation:

The 'COMPRESSION = AUTO' parameter in the file format definition allows Snowflake to automatically detect and decompress gzipped files while also reading uncompressed files. The 'SKIP HEADER = 1' parameter ensures that the header row in the CSV files is skipped.

### NEW QUESTION # 143

A data engineering team is building a real-time data pipeline in Snowflake. Data arrives continuously and needs to be processed with minimal latency. The team is using Snowflake Streams and Tasks for incremental data processing. However, they are encountering issues where the tasks are sometimes skipped or delayed, leading to data inconsistencies. Which combination of actions would BEST address these issues and ensure reliable near real-time data processing?

- A. Increase the warehouse size to ensure sufficient compute resources. This will prevent tasks from being skipped due to resource contention.
- B. Monitor the 'TASK HISTORY' view regularly to identify skipped or delayed tasks and manually re-run them as needed. This is a reactive approach and does not prevent future occurrences.
- **C. Configure the tasks to run using a serverless compute model (Snowflake-managed compute). Ensure the parameter is set to a higher value and implement error handling within the task using TRY/CATCH blocks.**
- D. Disable task scheduling and rely solely on Snowflake's Auto-Resume feature for warehouses. This simplifies the pipeline and reduces the chance of errors.
- E. Adjust the 'ERROR\_INTEGRATION' parameter on the task definition to send notifications when tasks fail. This allows for manual intervention but does not prevent skipping.

**Answer: C**

Explanation:

Option C is the best solution. Serverless compute allows Snowflake to automatically manage resources for the tasks, ensuring they are not skipped due to insufficient compute. Setting 'SUSPEND TASK AFTER NUM FAILURES' avoids immediate suspension after a transient failure, and TRY/CATCH allows for robust error handling. Increasing warehouse size (A) may help, but serverless provides better elasticity. B only provides notification. D is incorrect as disabling tasks removes automation. E is a reactive approach.

#### NEW QUESTION # 144

You are tasked with designing a data pipeline that ingests JSON data from an external stage (AWS S3). The JSON files contain records for various product types, each having a different set of attributes. Some product types might have attributes that are not present in other types. You want to create a single Snowflake table that can accommodate all product types without defining a rigid schema upfront and also be queryable efficiently. Which of the following approaches, combining external tables, schema evolution and querying, would be MOST effective? (Choose two)

- A. Create a stored procedure that dynamically infers the schema from the JSON files and creates a new Snowflake table based on the inferred schema.
- **B. Create a single external table with a VARIANT column to store the entire JSON record for each product. Use LATERAL FLATTEN to extract specific attributes during querying.**
- C. Load all the data into a raw Snowflake internal table. Use dynamic SQL to infer distinct product types and create views on top of the raw table for each product type.
- **D. Create a single external table with a VARIANT column and use the 'VALIDATE' function to identify and handle schema inconsistencies during data loading.**
- E. Create a separate external table for each product type, defining the schema for each table based on the attributes present in the corresponding JSON files.

**Answer: B,D**

Explanation:

Options B and D provide the most effective solution for handling diverse JSON data with schema evolution and efficient querying. Option B allows for storing the entire JSON record in a VARIANT column, enabling flexibility in accommodating varying product attributes. LATERAL FLATTEN allows extracting specific attributes needed during querying. Option D further enhances this by using the VALIDATE function (part of COPY INTO when loading into a table using COPY INTO FROM @stage), even though in this case we are using an external table, to identify schema inconsistencies and handle them appropriately. Option A is not scalable, Option C requires a lot of code and is difficult to maintain and option E, requires too much SQL to execute, making it expensive.

#### NEW QUESTION # 145

You are tasked with implementing a data loading process for a table 'CUSTOMER DATA' in Snowflake. The source data is in Parquet format on Azure Blob Storage and contains personally identifiable information (PII). You must ensure that the data is loaded securely, masked during the loading process, and that only authorized users can access the unmasked data after the load. Assume you have already created a stage pointing to the Azure Blob Storage. Which of the following steps should you take to achieve this?

- A. Use a 'COPY' command with 'ON ERROR = SKIP FILE'. Use a Task to monitor load failures and trigger alerts.
- B. Load the data without masking. Implement dynamic data masking policies on the table's PII columns using Snowflake's Enterprise edition features. Use a 'COPY' command with ERROR = CONTINUE
- C. Use a 'COPY' command with the 'ENCRYPTION = (TYPE = 'AZURE CSE', KEY = option to encrypt the data during load. Implement role-based access control to restrict access to the table.
- D. Load the data directly into a 'VARIANT' column. Use a SQL transformation with 'FLATTEN' and masking policies on the extracted columns.
- E. Use a 'COPY' command with the 'TRANSFORM' clause and JavaScript UDFs to mask the PII data during the load process. Implement masking policies on the 'CUSTOMER DATA' table to restrict access to the unmasked data.

**Answer: E**

Explanation:

Option B is the most comprehensive solution for secure data loading and PII protection. 'TRANSFORM' and JavaScript UDF masking during load prevent PII from being stored unmasked, enhancing security. Implementing masking policies provides granular control over access to the sensitive data post-load. It's more secure to avoid storing sensitive information even temporarily. Option A encrypts the data in transit but doesn't address masking. Option C requires dynamic data masking, but masking during copy is optimal. The correct way to copy and mask PII data is using a JavaScript UDF to mask the PII data during the load process, and then implement Masking Policies on the table.

## NEW QUESTION # 146

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