**ETL Project Purpose and Scope**

Our company is an asset manager located in NYC. As part of our day to day operations, we invest in total returns swap with single name equities as underlier. This means we have synthetic exposure to common stocks, without directly purchasing them in the market. Instead, we increase our exposure by investing in a swap derivative in which we agree, with any given counterparty, to exchange the profits and losses of a particular underlier, including dividends associated with the particular stock.

For example, in a normal stock purchase and sale, we would buy stock X at $100 in cash and sell the stock at a future date for $110 in cash, thereby realizing a profit of $10. Any dividends during the holding period of stock X are credited (or debited in the case of short stocks) automatically from our prime broker accounts.

Assuming the same exposure was entered into via a total return swap (“TRS”), we would open the contract with a notional cost of $100 and exit the position with a notional dollar value of $110. There would be no exchange of cash on the opening date, but we would instead settle the contract by directly receiving $10 form the counterparty upon the closing of the position (the “unwind”). In this scenario any dividends during the holding period of the TRS would also be settled at the unwind (instead of being automatically credited to our account on the pay date). For instances in which only a portion of open lots are unwound, only the dividends pertaining to the unwound lots are settled, to the extent that said dividends are also past pay date.

The difference between both types of investments, as it relates to accounting of the dividends, is that while dividends are simply accrued on ex date and settled on pay date for ordinay stock positions, we must continue to track accrued dividends even after pay date for TRS since they will only impact our cash balances to the extent that divdends on TRS are unwound. This presents a reporting/tracking challenge since dividends are not applied at the lot level in our database. The following illustrates how dividends accrual reports would be laid out for each type of position:

1. Common stock dividend accrual report:
   1. List ticker, ex date, pay date, dividend rate, shares eligible for the dividend based on record date
   2. On ex date: include dividends attributable to shares of common
   3. On pay date: remove dividends. On pay date, the dividend should no longer remain on the dividend accrual balance since we expect cash settlement to be processed at the prime broker.
2. TRS dividend accrual report:
   1. List ticker of underlier, ex date, pay date, dividend rate, shares eligible for the dividend based on record date
   2. On ex date: include dividends attributable to shares of common
   3. On pay date: **do not** remove dividends. On pay date, the dividend are eligible for settlement at an unwind event, but does not automatically settle until such event occurs.
   4. On unwind date: remove dividends on a pro rata basis based on the dividends applicable to the lots being unwound. For example, consider a TRS position with the following attributes:
      1. 2 shares of underlier exposure with different lot dates – one opened on 12/1/18 and another opened on 12/31/18
      2. Dividend ex date of 12/7/18
      3. Pay date of 1/5/19
      4. Unwind date of 1/10/19 for for 1 share of the TRS
      5. Dividend rate of $10 per share
      6. LIFO tax lot relief method selected

Since LIFO is selected in this example, the last share purchased would be the one unwound. Since the purchase date of this lot is after the ex dividend date, the lot was not eligible for the 12/7/18 dividend. As such, there would be no settlement of the dividend accrual of $10 (1 lot held at ex date \* $10 per share dividend rate = $10 dividend accrual balance). Assuming the 12/1/18 remains open for the subsequent 3 years, the dividend accrual balance should remain open as well. That is, there’s no realization (cash settlement) of said dividend until the position is unwound.

The challenge in tracking our TRS dividend accrual is that when we accrue our dividend, we simply calculate the amount of dividends based on our holdings and apply it as a adjustment to our daily performance for the particular position. That is, once calculated and applied, we do not make any distinction as to which particular lots the calculated dividend pertains to. As such, there are two alternatives to creating this type of lot-level dividend tracking. The first option is to calculate and apply dividends at the lot level so that they may be tracked throughout the holding period of the particular lot and unwound on a pro rate basis. Alternatively, we can create of series of joins in our SQL db in order to instantaneously calculate how much of our dividends that were booked during a particular date window apply to each open lot in our database. Based on the complexity involved in the first option, I decided to explore the alternative through this ETL project. Thus, the goal of this ETL project is to create a report using multiple tables that allows the accounting and operations team to quickly and accurately determine the amount of TRS dividend accrual balances remain open as of a selected period end date.

**Extract: your original data sources and how the data was formatted (CSV, JSON, MySQL, etc).**

For this project, I used a development (backup) version of my work database. This database includes the following tables used for this project:

1. Dbo.CorporateAction (the “CACS” table): This table contains historical list of corporate actions, including dividends, for investments held in our portfolio during the corporate action date (e.g. stock splits, dividends, reverse splits, reorganizations, ticker changes, etc.). See **Exhibit A**.
2. Dbo.TaxLots\_NEW (the “Lots” table): This table contains all of the lot level detail for our portfolio holdings. See **Exhibit B**. Key lot level details include:
   1. Date of purchase (aka the lot date)
   2. Purchase price (aka lot price)
   3. Security ID (primary key),
   4. Shares held for the particular lot
   5. Broker ID where the particular lot is custodied
3. Dbo.PositionAdjustment (the “Div” table): This table contains a listing of performance adjustments used to adjust our profits and losses (“PnL”) recorded in our Port table for amounts relating to interest, borrow income/expenses, swap financing, and dividends. See **Exhibit C**.
4. Dbo.Broker (the “Brk” table): This table contains a listing of prime brokers that we, as a firm, use for custody of our investments. See **Exhibit D**.
5. Dbo.PositionArchive (the “Port” table): This table contains a historical record of our investments portfolio by date, broken out by the following:
   1. Security ID
   2. Broker ID
   3. Portfolio manager ID
   4. Shares held
   5. MV for each particular date
   6. PnL for each particular date (including stock performance and adjustments from the Div table.
   7. See **Exhibit E**

**Transform: what data cleaning or transformation was required.**

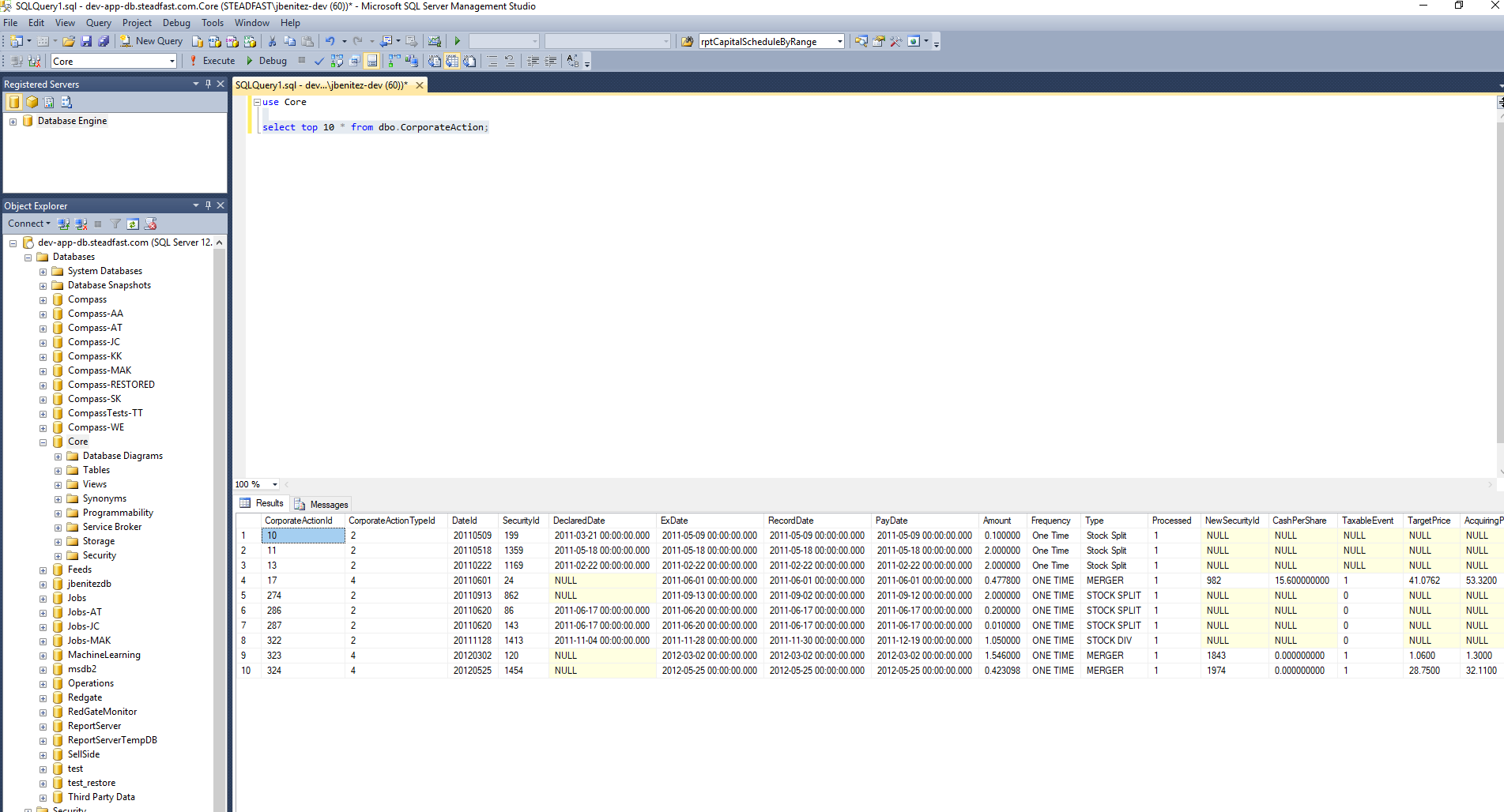
The following lists the transformation of data performed to meet the project goal:

1. Create variable date inputs
2. Join tables
3. Date formatting for certain date id fields
4. Format dollars
5. Ticker filter: ending in \_SW
6. Group by (aggregation):
7. Save as stored procedure
8. VBA macro to call stored procedure – *out of scope*

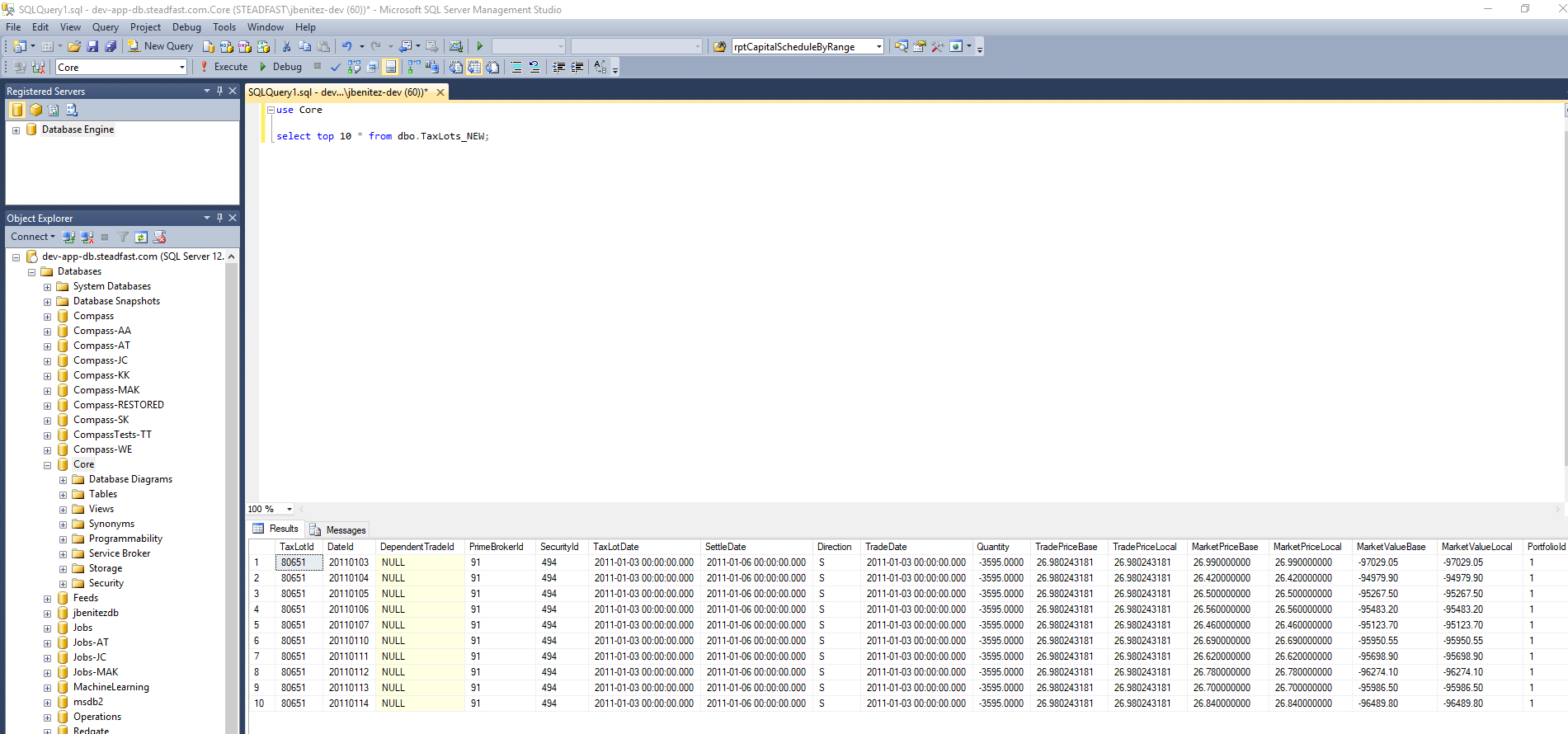
After performing the above data cleaning and transformation, I was able to produce a query that solved the challenge mentioned in the purpose section: To show the amount of TRS dividends attributable to each open lot as of a particular date. The final query to produce the required report can be viewed in **Exhibit F**.

**Load: the final database, tables/collections, and why this was chosen.**

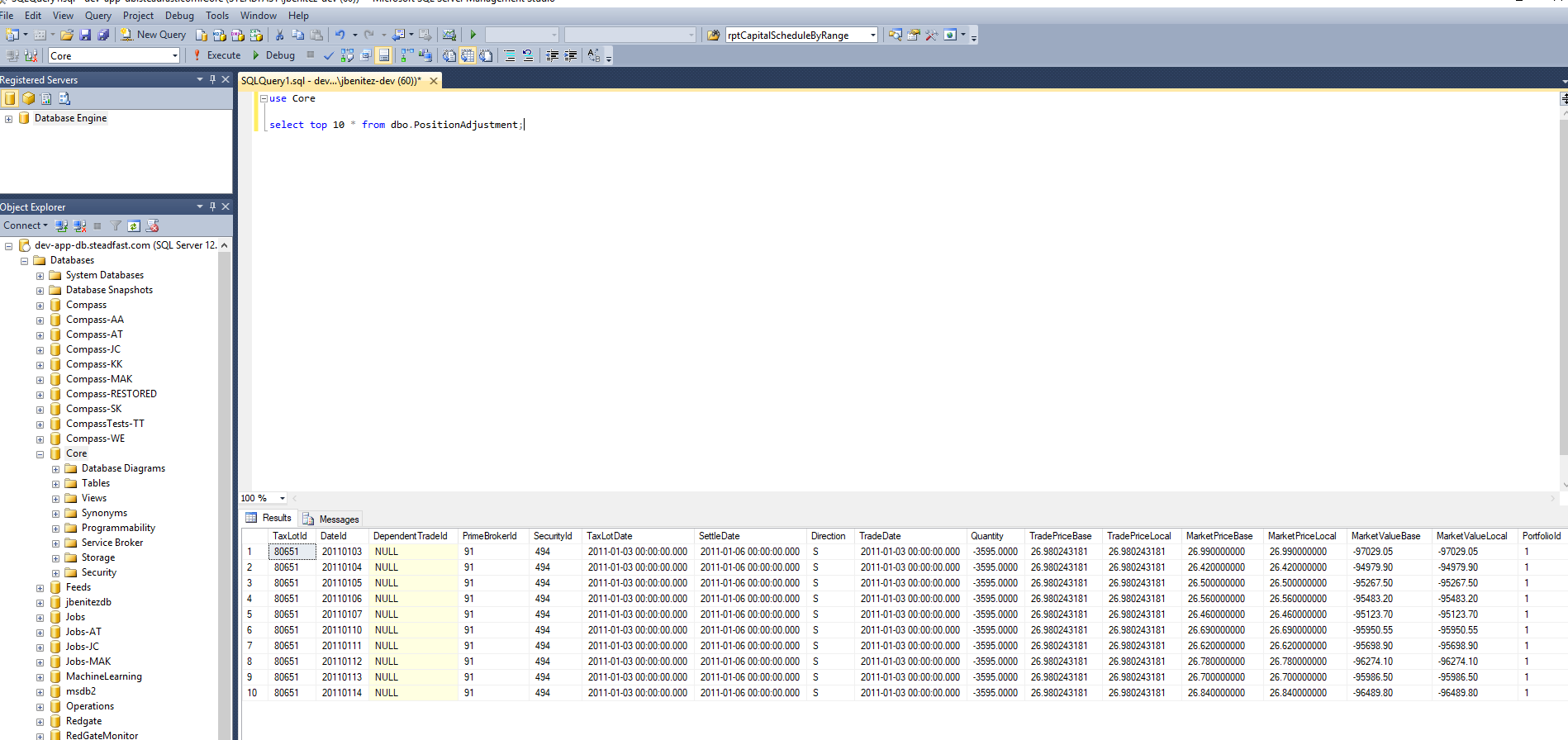
**Exhibit A**

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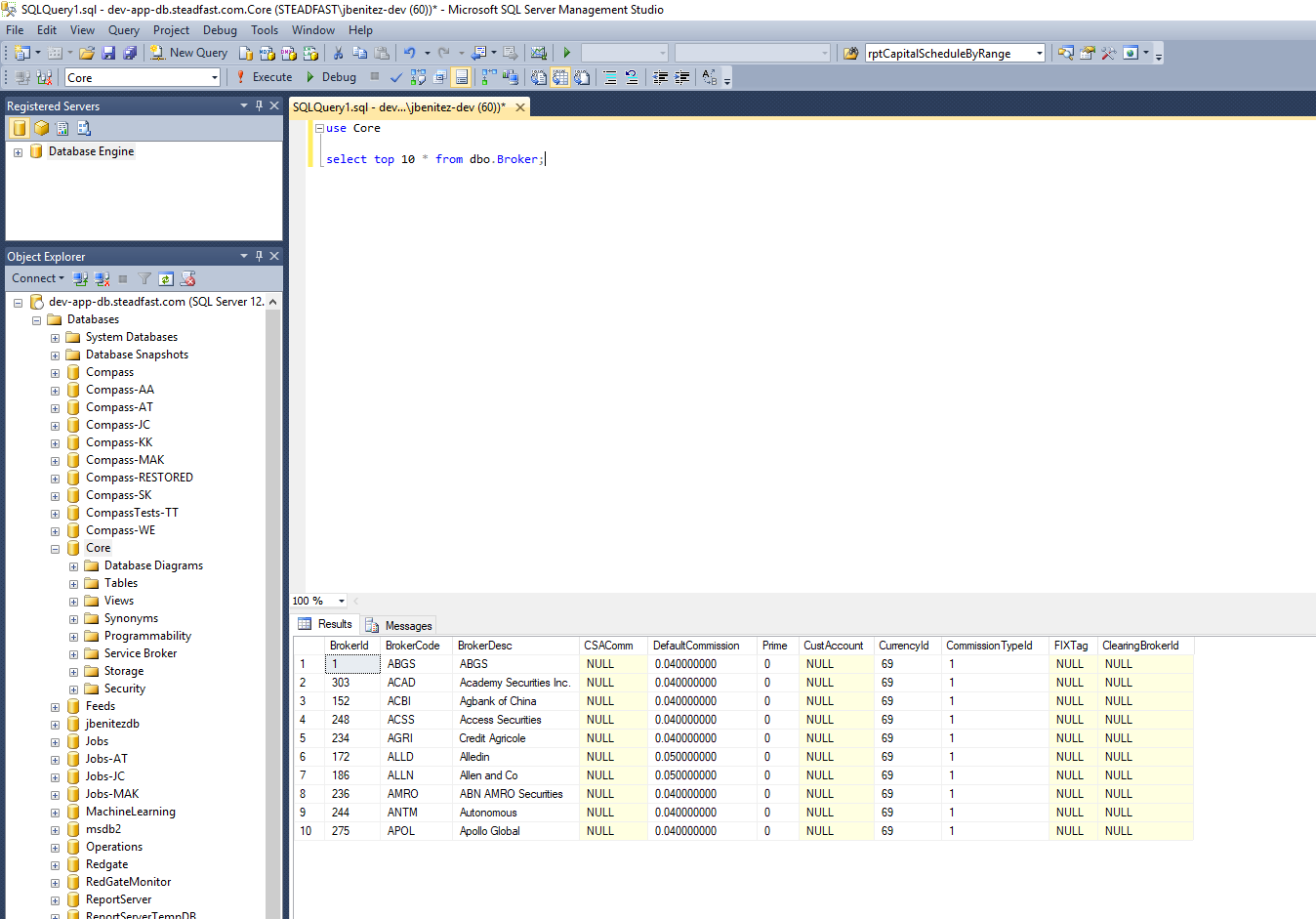
**Exhibit B**

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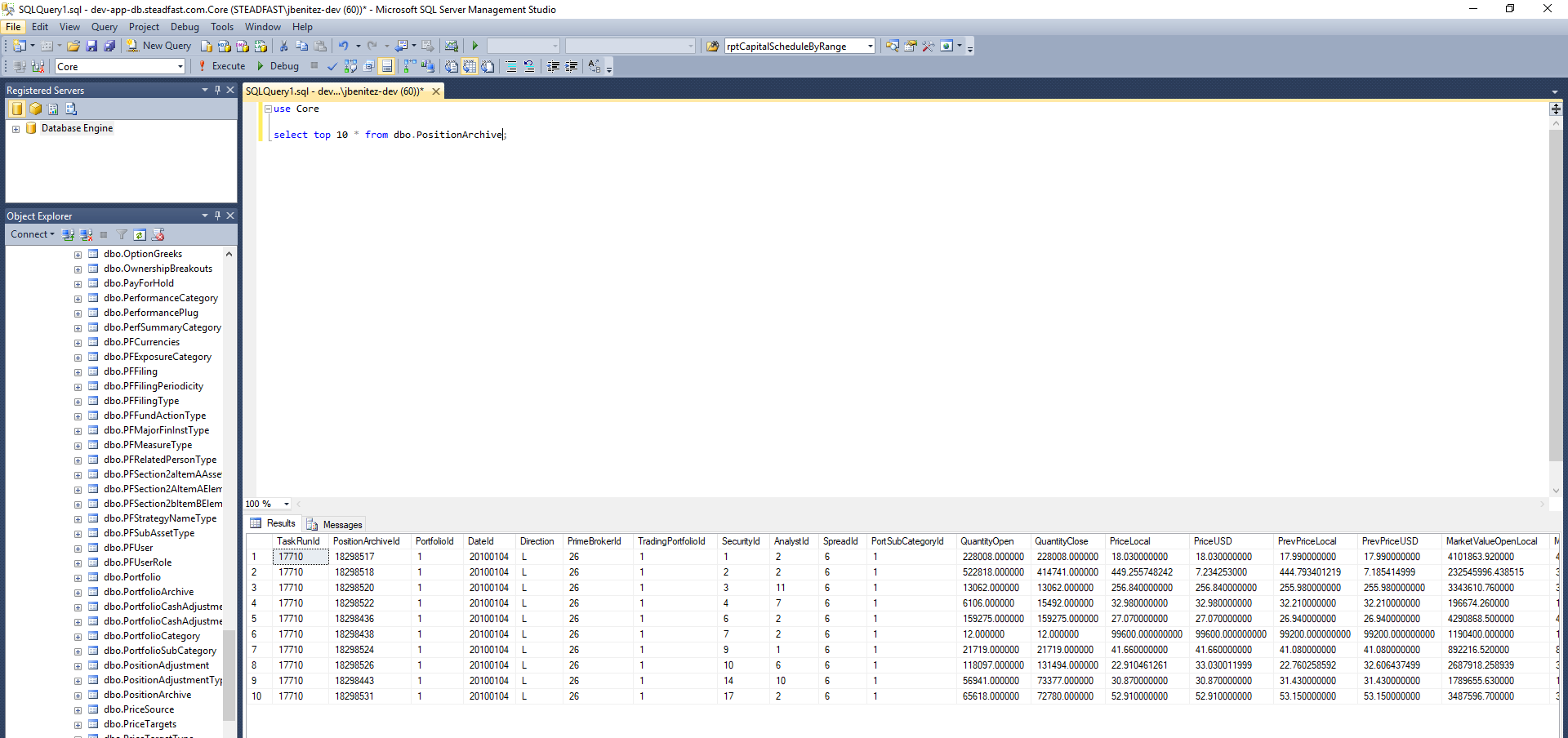
**Exhibit C**

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**Exhibit D**

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**Exhibit E**

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**Exhibit F**

