

Dimensional Modeling  
ISM6208.020U19 Data Warehouse  
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# STOCK MARKET DIMENSIONAL MODELING

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# Overview:

- ◉ Lagging Indicators are an economic measurement used to evaluate the performance of a business after an event.
- ◉ This case study identifies some lagging indicators and leading indicator.
- ◉ **Lagging Indicators** that will be mentioned are GDP\_Value & Unemployment Rate.
- ◉ Stock Market Volume is the **Leading Indicator** that will be mentioned.
- ◉ Stocks data warehouse design and queries are derived from the FIN user schema.



# Overview continued...

- ⦿ Our group selected **Star Schema** to illustrate the Dimensional Model of this particular case study.
- ⦿ The Star Schema will consist of fact tables and dimensional tables.
- ⦿ **Fact table** represents the measured values.
- ⦿ **Dimension table** represents the data description.

# Fact Tables that were considered:

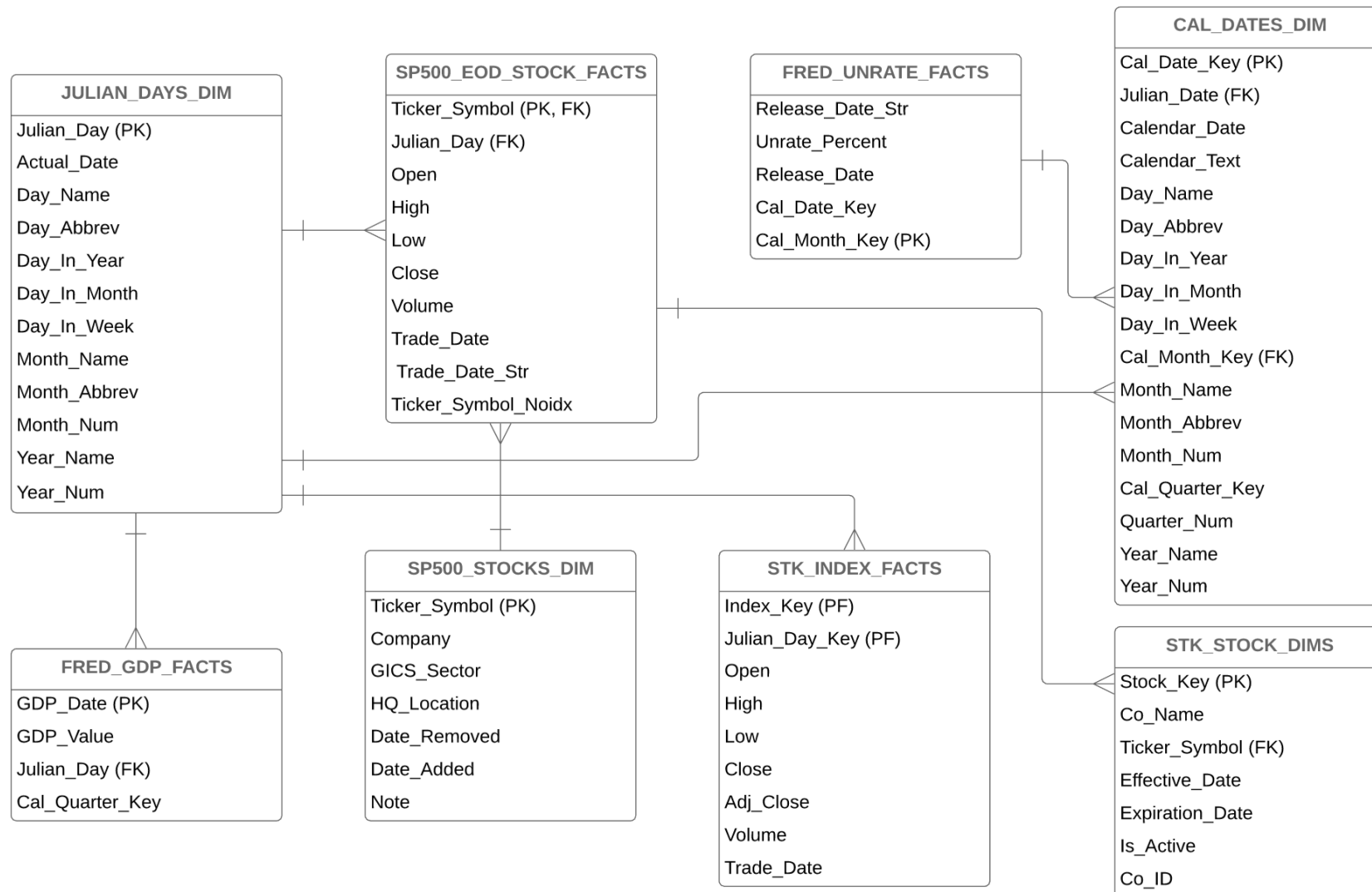
- ◉ SP500\_EOD\_STOCK\_FACTS
- ◉ FRED\_UNRATE\_FACTS
- ◉ STK\_INDEX\_FACTS
- ◉ FRED\_GDP\_FACTS

## Dimension Tables that were considered:

- ◉ JULIAN\_DAYS\_DIM
- ◉ CAL\_DATES\_DIM
- ◉ SP500\_STOCKS\_DIM
- ◉ STK\_STOCK\_DIMS



# Star Schema:

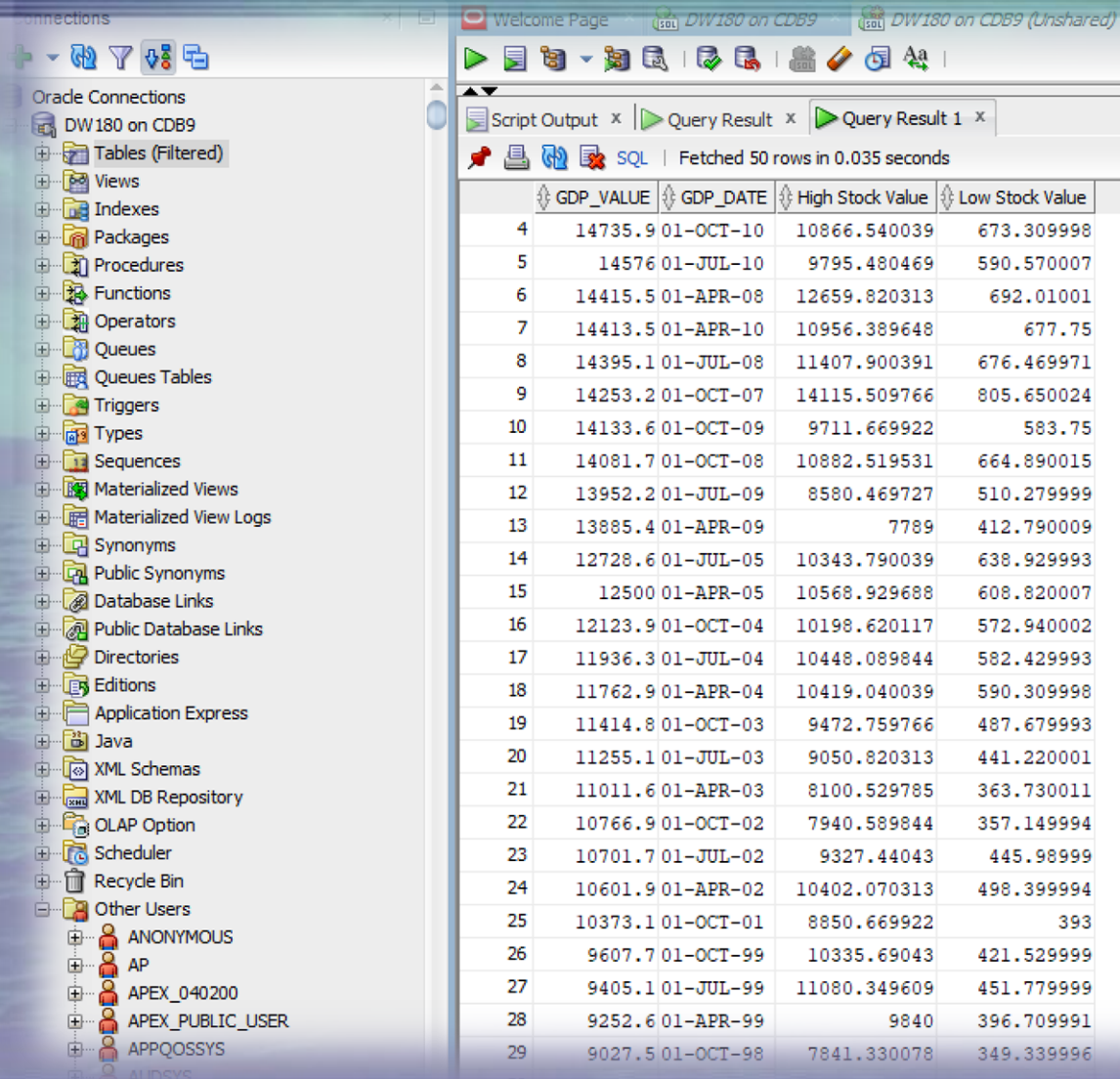


# Query 1: GDP as the Lagging Indicator and the movement of Stock Value

```
SELECT gdp.GDP_VALUE, gdp.GDP_DATE, MAX(sif.HIGH) AS "High Stock Value",  
       MIN(sif.LOW) AS "Low Stock Value"  
FROM   FRED_GDP gdp, STK_INDEX_FACTS sif  
WHERE  gdp.JULIAN_DAY = sif.JULIAN_DAY_KEY  
GROUP BY gdp.GDP_VALUE, gdp.GDP_DATE  
ORDER BY gdp.GDP_VALUE DESC, MAX(sif.HIGH) DESC, MIN(sif.LOW) DESC;
```

The result output in this query is quite surprising. Based on the result of the GDP\_Value and the highest and lowest stock value, there is no direct correctly between the three factors. It is then safe to assume that GDP is not an accurate indicator of the economy's current health.

# Output Query 1:



The screenshot displays the Oracle SQL Developer interface. On the left, the 'Connections' pane shows a tree structure for the 'DW180 on CDB9' connection, including categories like Tables, Views, Indexes, Packages, Procedures, Functions, Operators, Queues, Queues Tables, Triggers, Types, Sequences, Materialized Views, Materialized View Logs, Synonyms, Public Synonyms, Database Links, Public Database Links, Directories, Editions, Application Express, Java, XML Schemas, XML DB Repository, OLAP Option, Scheduler, Recycle Bin, and Other Users. The 'Query Result' pane on the right shows a table with 50 rows of data. The table has four columns: GDP\_VALUE, GDP\_DATE, High Stock Value, and Low Stock Value. The data is sorted by GDP\_DATE in descending order, with the first row showing GDP\_DATE '01-OCT-10' and GDP\_VALUE '14735.9'.

	GDP_VALUE	GDP_DATE	High Stock Value	Low Stock Value
4	14735.9	01-OCT-10	10866.540039	673.309998
5	14576	01-JUL-10	9795.480469	590.570007
6	14415.5	01-APR-08	12659.820313	692.01001
7	14413.5	01-APR-10	10956.389648	677.75
8	14395.1	01-JUL-08	11407.900391	676.469971
9	14253.2	01-OCT-07	14115.509766	805.650024
10	14133.6	01-OCT-09	9711.669922	583.75
11	14081.7	01-OCT-08	10882.519531	664.890015
12	13952.2	01-JUL-09	8580.469727	510.279999
13	13885.4	01-APR-09	7789	412.790009
14	12728.6	01-JUL-05	10343.790039	638.929993
15	12500	01-APR-05	10568.929688	608.820007
16	12123.9	01-OCT-04	10198.620117	572.940002
17	11936.3	01-JUL-04	10448.089844	582.429993
18	11762.9	01-APR-04	10419.040039	590.309998
19	11414.8	01-OCT-03	9472.759766	487.679993
20	11255.1	01-JUL-03	9050.820313	441.220001
21	11011.6	01-APR-03	8100.529785	363.730011
22	10766.9	01-OCT-02	7940.589844	357.149994
23	10701.7	01-JUL-02	9327.44043	445.98999
24	10601.9	01-APR-02	10402.070313	498.399994
25	10373.1	01-OCT-01	8850.669922	393
26	9607.7	01-OCT-99	10335.69043	421.529999
27	9405.1	01-JUL-99	11080.349609	451.779999
28	9252.6	01-APR-99	9840	396.709991
29	9027.5	01-OCT-98	7841.330078	349.339996



## Query 2: Unemployment Rate as the Lagging Indicator and High/Low Stock Value

```
SELECT ur.Unrate_Percent, esf.TICKER_SYMBOL, esf.TRADE_DATE, esf.HIGH AS "High Stock Value", esf.LOW AS "Low Stock Value"  
FROM FRED_UNRATE_FACTS ur, SP500_EOD_STOCK_FACTS esf  
WHERE JULIAN_DAY BETWEEN '2454833' AND '2455197'  
ORDER BY ur.Unrate_Percent DESC, esf.HIGH DESC, esf.LOW;
```

The output of this query shows the unemployment rate in 2009 in comparison to the moving stock value. Based on the data, unemployment rate was at 10.8%. Due to the high unemployment rate, the stock value is low. This is a valid data as it shows that unemployment rate will significantly affect the economy's health. The value that I would hope to gather would be the stock value trend over the next 4-5 years to have a more accurate data on the impact of unemployment rate on the economy's health.

# Output Query 2:

SQL - Fetched 30 rows in 23.056 seconds

	UNRATE_PERCENT	TICKER_SYMBOL	TRADE_DATE	High Stock Value	Low Stock Value
1	10.8	GOOG	28-DEC-09	625.99	618.48
2	10.8	GOOG	28-DEC-09	625.99	618.48
3	10.8	GOOG	31-DEC-09	625.4	619.98
4	10.8	GOOG	31-DEC-09	625.4	619.98
5	10.8	GOOG	29-DEC-09	624.84	618.29
6	10.8	GOOG	29-DEC-09	624.84	618.29
7	10.8	GOOG	30-DEC-09	622.73	618.01
8	10.8	GOOG	30-DEC-09	622.73	618.01
9	10.8	GOOG	24-DEC-09	619.52	612.27
10	10.8	GOOG	24-DEC-09	619.52	612.27
11	10.8	GOOG	23-DEC-09	612.87	602.85
12	10.8	GOOG	23-DEC-09	612.87	602.85
13	10.8	GOOG	22-DEC-09	601.5	598.85
14	10.8	GOOG	22-DEC-09	601.5	598.85
15	10.8	GOOG	16-DEC-09	600.37	596.64
16	10.8	GOOG	16-DEC-09	600.37	596.64
17	10.8	GOOG	21-DEC-09	599.84	595.67
18	10.8	GOOG	21-DEC-09	599.84	595.67
19	10.8	GOOG	18-DEC-09	598.93	595
20	10.8	GOOG	18-DEC-09	598.93	595
21	10.8	GOOG	17-DEC-09	597.64	593.76
22	10.8	GOOG	17-DEC-09	597.64	593.76
23	10.8	GOOG	14-DEC-09	597.31	592.61
24	10.8	GOOG	14-DEC-09	597.31	592.61
25	10.8	GOOG	15-DEC-09	596.38	590.99
26	10.8	GOOG	15-DEC-09	596.38	590.99
27	10.8	GOOG	04-DEC-09	594.83	579.18
28	10.8	GOOG	04-DEC-09	594.83	579.18
29	10.8	GOOG	11-DEC-09	594.75	587.73
30	10.8	GOOG	11-DEC-09	594.75	587.73
31	10.8	GOOG	10-DEC-09	594.71	590.41
32	10.8	GOOG	10-DEC-09	594.71	590.41



## Query 3: Average Stock Market Volume, and High/Low Stock Value from 2009 forward

```
SELECT ssd.Co_Name, ssd.Ticker_Symbol, esf.Volume AS "Stock Volume",  
       AVG(esf.HIGH) AS "Average High Stock Value", AVG(esf.LOW) AS "Average Low Stock Value"  
FROM STK_STOCK_DIMS ssd, SP500_EOD_STOCK_FACTS esf  
WHERE esf.JULIAN_DAY >= '2454118'  
GROUP BY ssd.Co_Name, ssd.Ticker_Symbol, esf.Volume  
ORDER BY esf.Volume DESC;
```

A closure look on the Stock Market Volume in relation to the moving market value and a couple of years after the market crash (2007) shows that there is an increase in stock volume on pharmacological companies such as Celsion Corporation, CymaBay Therapeutics, Inc, and Cocystal Pharma, Inc. Although this may seem coincidental, it makes sense since the healthcare industry is one of the growing market.



# Query 3 Output:

Welcome Page DW180 on CD89 DW180 on CD89 (unshared) SP500\_EOD\_STOCK\_FACTS

Script Output x Query Result x

SQL | Fetched 600 rows in 5.02 seconds

	CO_NAME	TICKER_SYMBOL	Stock Volume	Average High Stock ...	Average Low Stock Value
1	Alphabet Inc.	GOOG	21474836	3.4	3.21
2	CymaBay Therapeutics, Inc.	CBAY	21474836	3.4	3.21
3	Caterpillar Inc.	CAT	21474836	3.4	3.21
4	Cocrystal Pharma, Inc.	BZNE	21474836	3.4	3.21
5	Xcerra Corporation	XCRA	21474836	3.4	3.21
6	CymaBay Therapeutics, Inc.	CYMA	21474836	3.4	3.21
7	Alphabet Inc.	GOOGL	21474836	3.4	3.21
8	Cynergistek, Inc.	CTEK	21474836	3.4	3.21
9	Walmart Inc.	WMT	21474836	3.4	3.21
10	Celsion Corporation	CLSN	21474836	3.4	3.21
11	Cocrystal Pharma, Inc.	COCF	21474836	3.4	3.21
12	Cynergistek, Inc.	CTEKD	21474836	3.4	3.21
13	Target Corporation	TGT	21474836	3.4	3.21
14	Xcerra Corporation	LTXC	21474836	3.4	3.21
15	Celsion Corporation	CLN	21474836	3.4	3.21
16	The Coca-Cola Company	KO	21474836	3.4	3.21
17	Cynergistek, Inc.	CTEK	18641591	4.83	4.41
18	The Coca-Cola Company	KO	18641591	4.83	4.41
19	Alphabet Inc.	GOOGL	18641591	4.83	4.41
20	CymaBay Therapeutics, Inc.	CYMA	18641591	4.83	4.41
21	Cynergistek, Inc.	CTEKD	18641591	4.83	4.41
22	Cocrystal Pharma, Inc.	COCF	18641591	4.83	4.41
23	Celsion Corporation	CLSN	18641591	4.83	4.41
24	Caterpillar Inc.	CAT	18641591	4.83	4.41
25	Target Corporation	TGT	18641591	4.83	4.41
26	CymaBay Therapeutics, Inc.	CBAY	18641591	4.83	4.41
27	Xcerra Corporation	LTXC	18641591	4.83	4.41
28	Alphabet Inc.	GOOG	18641591	4.83	4.41
29	Cocrystal Pharma, Inc.	BZNE	18641591	4.83	4.41
30	Walmart Inc.	WMT	18641591	4.83	4.41