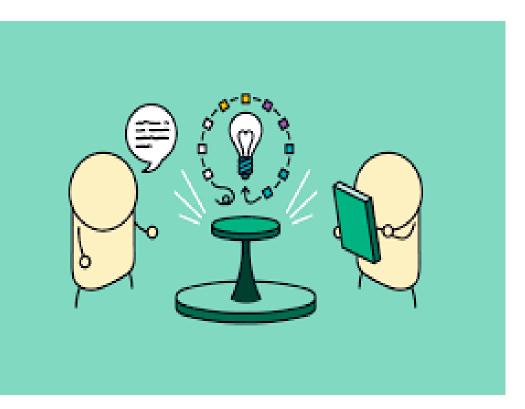


# GOLD PRICE PREDICTION/FORECASTING

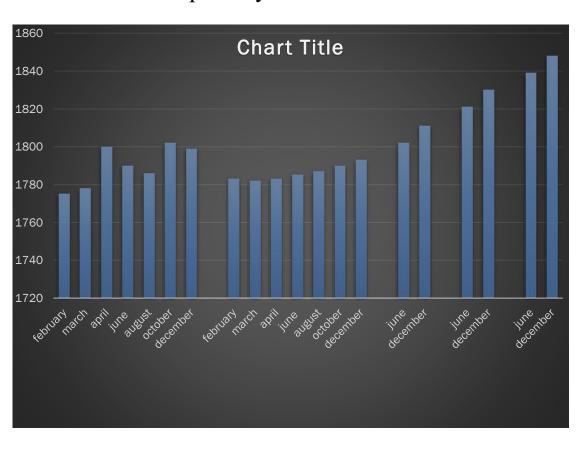
AUTHOR: TAGHIZADEH KHADIJA



Quantitative forecasting uses the past trend of a particular variable in order to make a future forecast of the variable. In recognition of this method's reliance on time series, it is commonly called the "time series method. "Time series data are useful when you are forecasting something that is changing over time. Anything that is observed sequentially over time is a time series. When forecasting time series data, the aim is to estimate how the sequence of observations will continue into the future.

There are various factors that may influence gold sector physical market factors as well as those related to trading and financial markets. We describe some key factors that could influence gold price sales and explore possible linkages between each factor.

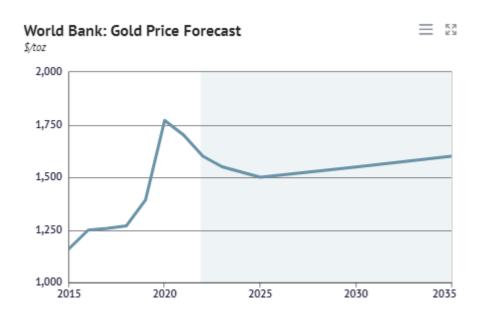
### Gold futures price by contract month 2021-2025



The gold market is composed of a physical gold market (commodity) in which gold bullions and coins are sold and bought and a paper gold market (currency or monetary asset), which entails trading in claims to physical stock instead of stock themselves. The "London OTC Market", the "U.S. Futures Market" (COMEX) and the "Shanghai Gold Exchange" (SGE) are the three primary gold trading hubs. These markets account for over 90% of the trading volume in the world, accompanied by smaller secondary markets worldwide. These secondary markets include Dubai, India, Japan, Singapore, and Hong Kong. Notably, world gold prices are moving together nowadays, as there is no longer place for arbitrage. Figure 1 shows the monthly variations of gold price where two significant jumps in gold prices are observed. The first jump was in early January 1980, when gold prices reached \$630 per ounce and dropped dramatically in the same year due to high inflation, high oil prices, the intervention of Soviet Union in Afghanistan, and the impact of Iranian revolution which increases the demand for this precious metal. The second jump in gold prices started in 2021 following the worst financial crisis since the Great Depression and COVID. It continued to rise continuously as the highest price of gold in the second jump will be reached approximately \$1821 per ounce by the end of 2024. After that, it declined gradually and remained slightly fluctuating to the present.

Year		2021 Feb 17											
	February 2021	March 2021	April 2021	June 2021	August 2021	October 2021	December 2021	February 2022	April 2022	June 2022	August 2022	October 2022	December 2022
\$/toz	1,771.10	1,771.80	1,774.10	1,778.40	1,777.70	1,779.20	1,780.70	1,782.10	1,783.80	1,785.70	1,787.20	1,790.90	1,793.00

June 2023	December 2023	June 2024	December 2024	June 2025	December 2025
1,802.40	1,811.70	1,821.20	1,830.30	1,839.10	1,848.20



During the last year,the gold price increased from \$1,479.13 to \$1,858.42 marking 25.6% growth year-over-year. In the first month of 2021,gold prices averaged \$1,866.98/oz,0.46 percent up from December. TWB predicts the price of gold to decrease to \$1,470/oz in 2021 form an average of \$1775/oz in 2020. In the next 10 years, the gold price is expected to decrease to \$1,400/oz by 2030

Markets are pricing in nearly four rate hikes for next year, with the first move coming as early as May. Last week the Federal Reserve signaled that it could raise interest rates three times.

Dahdah said that the path of U.S. monetary policy will depend on the speed of the economic recovery. He added that if the world can move on from the COVID-19 pandemic, then there is a high probability that the Federal Reserve will meet its target.

The biggest unknown factor heading into the new year is COVID-19 and the new highly transmissible Omicron variant, which is spreading around the world. Some countries are looking at establishing new lockdown measures.

"If Omicron because a huge problem and major lockdown measures are implemented, then gold prices could easily go back to \$2,000 an ounce," said Dahdah.

However, Dahdah said that the major linchpin in global economic growth will be China. He said that new lockdown

measures in China will further disrupt the global supply chain, increasing inflation pressures and limited growth.

"Even if the rest of the world is locked down, if China remains open, then the global economy could still see a continued recovery," he said.



How can each factor theoretically affect the gold price?

Factor Type	Factor	Impact on Gold Price		
Fundamental	Jewellery Demand	Positive		
Fundamental	Central Bank Demand	Positive		
Fundamental	ETF Demand	Positive		
Macro	Inflation Rate	Positive		
Macro	Interest Rate	Negative		
Macro	Money Supply	Positive		
Macro	Dollar Strength	Negative		

The impact of the fundamental factors is the easiest to understand. The more gold governments and people purchase, the less gold there are in the market and the price should climb up.

### What Moves Gold Prices?

The price of gold is moved by a combination of supply, demand, and investor behavior. That seems simple enough, yet the way those factors work together is sometimes counterintuitive. For instance, many investors think of gold as an <u>inflation</u> hedge. Central banks have tried to manage their gold sales in a cartel-like fashion, to avoid disrupting the market too much. Something called the Washington Agreement essentially states that the banks won't sell more than 400 metric tons in a year. It's not binding, as it's not a treaty; rather, it's more of a gentleman's agreement—but one that is in the interests of central banks, since unloading too much gold on the market at once would negatively affect their portfolios.

### Why Gold Price is Increasing?

#### 1. Demand and Supply

As is true with any traded commodity, the demand and supply of gold, plays an important role in determining its price. Unlike oil, gold is not a consumable product. All the gold that has ever been mined is still available in the world. The amount of gold mined every year is not very high. If the demand for gold increases, the price increases since the supply is relatively scarce. Hence if you're wondering why gold price is rising, demand-supply conditions may be one of the reasons.

#### 2. Inflation

When the inflation rates rise, the value of the currency decreases. Also, most other investment avenues fail to deliver inflation-beating returns. Hence, most people start investing in gold. Even if high rates of inflation last for an extended period, gold acts as a perfect hedge since it is not affected by fluctuations in the value of the currency.

#### 3. Interest Rates

Gold prices have an inverse relationship with interest rates. When the interest rates fall, people don't get good returns on their deposits causing an increase in gold demand and so the price. On the other hand, when the interest rates rise, people sell their gold and invest in deposits to earn high interest leading to a drop in demand and price.

#### 4. Indian Jewelry Market

In India, gold jewelry is integral to most religious festivals and weddings. That is why, during festivals and wedding seasons, the demand for gold increases, boosting its price. This is one of the reasons why why gold rate increase in India.

#### 5. Government Reserves

The Government of India holds gold reserves. Based on its policies, it can buy or sell gold through the Reserve Bank of India (RBI). The price of gold can get impacted depending on whether it buys or sells more. Therefore if you are wondering why the gold price is rising in India at any given point in time, government purchases and sales is also something you should look at.

#### 6. Import Duty

India contributes less than one percent to global gold production. However, it is the second-largest consumer of precious metals. It imports a lot of gold to meet the high demand. Therefore, import duty plays an essential role in the price of gold.

#### 7. Currency Fluctuations

In the international markets, gold is traded in USD. While import price of gold and hence the selling price.

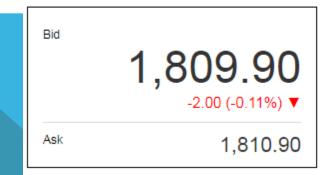




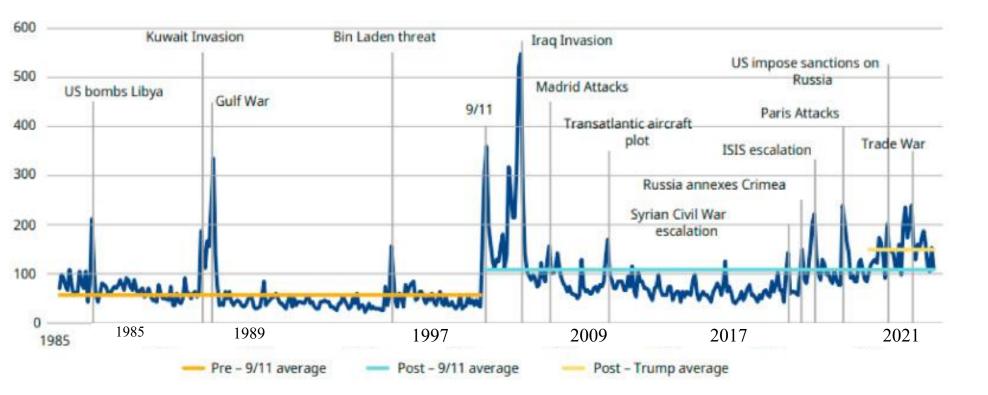


# **Gold Price Today**

Dec 27, 2021 23:02 NY Time

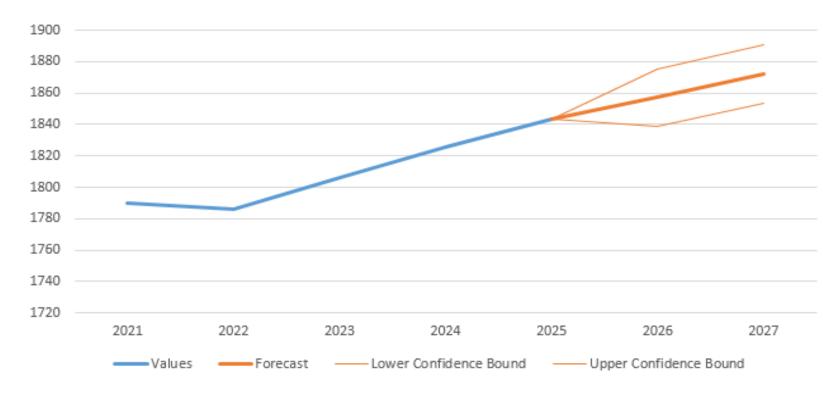


Gold Spot Price	Gold Price Today	Change
Gold price per ounce	1,809.90	-2.00
Gold price per gram	58.19	-0.06
Gold price per kilo	58,189.64	-64.30
Gold price in pennyweight	90.50	-0.10
Gold price in tola	678.71	-0.75
Gold price in tael (HK)	2,199.53	-2.43



Geopolitical And Economic Events In Gold Sector

A number of events are coming together which are set to push gold prices higher. Besides a combination of continuing inflationary policies and massive future budget deficits undermining the dollar, by closing down derivative market activities new Basel 3 regulations appear set to deflect some demand into physical metals. Furthermore, liquidity in gold markets will contract, potentially making prices more volatile.



Timeline <b>▼</b>	Values 💌	Forecast 💌	Lower Confidence Bound	Upper Confidence Bound
2021	1790			
2022	1786.143			
2023	1806.5			
2024	1825.5			
2025	1843.5	1843.5	1843.50	1843.50
2026		1857.3632	1839.11	1875.62
2027		1872.2466	1853.42	1891.07

#### Gold Price Forecast 2025-2030

Though it is hard to say for sure for such a long period of time, experts from different resources concur that gold will continue rising. However, they have opposite opinions about the speed of this growth. Most price forecasts aren't worth more than an umbrella in a hurricane. There are so many factors, so many ever-changing variables, that even the experts usually miss the mark. So while we take predictions with a grain of salt, let's look at what might be ahead for gold price in 2021 and the next 5 years. We'll first summarize what many analysts are predicting, and then look at the factors that are likely to have the biggest impact on gold. I'll conclude with the probable prices I see based on those factors, as well as some longterm projections.

$$F_t = \alpha A_{t-1} + (1-\alpha) F_{t-1}$$

F<sub>t</sub> Actual demand

α Smoothing constant

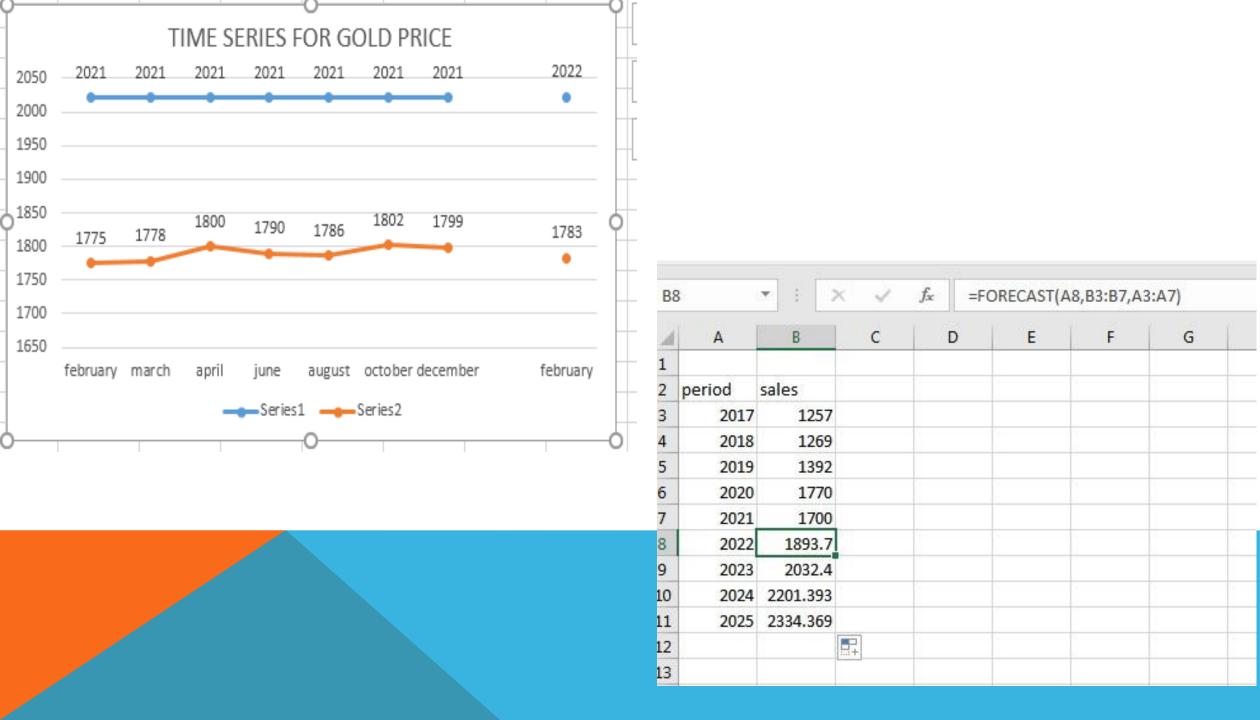
 $A_{t-1}$  Previous period's actual demand

Exponential smoothing weights past observations with exponentially decreasing weights to forecast future values. In other words, the new forecast is the old one plus an adjustment for the error that occurred in the last forecast.

This method is suitable for forecasting data with no trend or seasonal pattern, data with only random variation, short term forecasting.

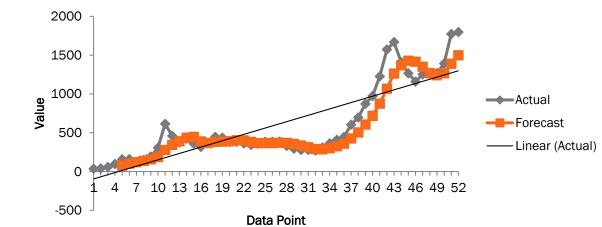
In other words, the new forecast is the old one plus an adjustment for the error that occurred in the last forecast.

F. Previous period's forecast demand



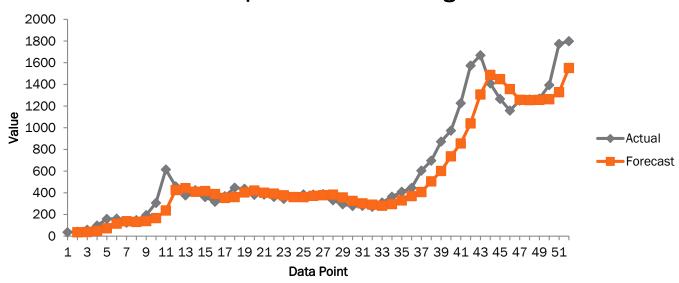
1969	Year 🚚	Average Closing Pri	Exponential Smoothing	Standart dv
1971 40,8 1972 58,17 #N/A #N/A 1973 97,12 35,96 #N/A 1974 158,76 38,38 #N/A 1975 160,87 48,275 #N/A 1976 124,8 72,6975 58,26443173 1977 147,84 115,72875 58,26443173 1978 193,57 138,299375 62,79681622 1979 307,01 131,5496875 56,64721083 1980 614,75 139,6948438 28,78274866 1981 459,16 166,6324219 87,3189056 1982 376,11 236,8212109 87,3189056 1983 423,71 425,7856055 234,8322566 1984 360,65 442,4728027 23,559331 1985 317,42 409,2914014 222,3720916 1986 368,2 416,5007007 43,68740392 1987 446,84 388,5753503 50,76487743 1988 436,78 352,9976752 52,8844042 1989 381,27 360,5988376 52,95751543 1990 383,73 403,7194188 65,1453059 1991 362,34 420,2497094 54,0421156 1992 343,87 400,7598547 57,8790633 1993 360,05 392,2449273 31,10431763 1994 384,16 377,2924637 30,02076157 1995 384,07 366,5812318 76,9706183 1996 387,73 360,3156159 23,705821318 76,9706183 1998 294,12 378,153904 15,3713766 1999 278,86 382,941952 16,3325547, 2000 279,29 356,970976 31,2499000 271,19 325,545488 73,3987301 2001 277,19 325,545488 73,3987301 2002 310,08 302,202744 54,2455723; 2004 409,53 220,666 601,1241904 164,156376 2016 1251,92 1448,731472 287,7093857 74,66661903 2007 696,43 369,6035232 74,465661903 2018 1266,66 601,1241904 164,156376 2016 1251,92 1448,731472 237,7382101 2019 1393,34 1255,023674 74,245272 77,312520 2010 1277,73 1250,034 1255,023934 1558,00346 1555,023934 1558,00346 1555,023934 1558,00346 15551,02607 177,773,73 1255,029671 1555,029671 1576,965846 15551,029671 1576,03660 1307,04587 78,90453 2001 1277,73,73 1255,029671 1576,965846 15551,029621 1576,9635466 1325,023934 1558,00346 15551,029621 1576,9635466 1325,023934 1558,00346 15551,029621 1576,9635466 1325,029671 1576,0366 1325,029671 1576,0366 1325,029671 1576,0366 1325,029671 1576,0366 1325,029671 1576,0366 1325,029671 1576,0366 1325,029671 1576,0366 1325,029671 1576,0366 1325,029671 1576,0366 1325,029671 1576,0366 1325,029671 1576,0366 1325,029671 1576,0366 1325,029671 1576,0366 1325,029671 1576,0366 1325,029671 1576,0366 1325,029671 1576,0366 1325,029671 1576,0366 1325,029671 1576				
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1983	1981	459,16	166,6324219	33,41726035
1984 360,65 442,4728027 233,5593317 1985 317,42 409,2914014 1986 368,2 416,5007007 43,68740392 1987 446,84 388,5753503 50,76487743 1988 436,78 352,9976752 52,88440424 1990 383,73 403,7194188 65,14530594 1991 362,34 420,2497094 54,04211569 1992 343,87 400,7598547 57,8790632 1993 360,05 392,2449273 31,10431763 1994 384,16 377,2924637 30,02076157 1995 384,07 360,5812318 27,69706182 1996 387,73 360,3156159 25,89496711 1997 331 372,237808 23,70582163 1999 278,86 382,941952 16,33255472 2000 279,29 356,970976 31,24990005 2001 271,19 325,545488 47,39871016 2002 310,08 302,02744 54,24557232 2003 363,83 290,746372 47,09838572 2004 409,53 280,968186 282,07792758 2005 444,99 295,524093 24,1863822 2006 604,34 329,6770465 44,33075054 2007 696,43 369,6035232 62,95418655 2008 872,37 407,2967616 74,66661903 2010 1226,66 601,1241904 164,1563767 2010 1226,66 601,241904 164,1563767 2011 1573,16 736,7470952 22,6605162 2012 1668,86 855,2035476 222,6605162 2014 1266,06 1307,045887 398,904543 2015 1158,86 1487,952943 429,0129105 2016 1251,92 1448,731472 374,3125399 2017 1260,39 1357,395736 155,803164 2019 1393,34 1255,023934 155,803262 114,7225213 2020 1773,73 1257,706967 114,7225213 2021 1798,54 1263,318483 1267,9405492 75,41075496	1982	376,11	236,8212109	87,31890056
1985 317,42 409,2914014 222,3720916 1986 368,2 416,5007007 43,68740372 1987 446,84 388,5753503 50,7648774 1988 436,78 352,9976752 50,788440422 1989 381,27 360,5988376 65,1453052 1990 383,73 403,7194188 65,1453052 1991 362,34 420,2497094 65,1453052 1992 343,87 400,7598547 57,8790632 1993 360,05 392,2449273 31,10431763 1994 384,16 377,2924637 30,02076187 1995 384,07 360,5812318 27,69706187 1996 387,73 360,3156159 25,89496713 1997 331 372,237808 15,3713763 1998 294,12 378,153904 15,3713763 1999 278,86 382,941952 23,70582163 1999 278,86 382,941952 36,970976 31,24990003 270,29 356,970976 31,24990003 2001 271,19 325,545488 54,2455723 2003 363,83 290,746372 47,09838573 2004 409,53 280,968186 220,774925 24,1863823 2005 444,99 295,524093 24,18638232 2006 604,34 329,6770465 604,34 369,6035232 62,95418659 2007 696,43 369,6035232 62,95418659 74,66661903 2009 973,66 505,8183808 130,237799 2010 1226,66 601,1241904 222,6605162 2012 1668,86 855,2035476 235,2550411 1573,16 736,7470952 235,2550413 222,6605162 2012 1668,86 855,2035476 235,2550413 228,399045438 2015 1158,86 1487,952943 374,3125399 2016 1251,92 1448,731472 298,709394 2016 1251,92 1448,731472 298,709394 2017 1260,39 1357,395736 238,3496136 2019 1393,34 1255,023934 155,8031264 114,7225213 80,02680424 1551,029621 1551,029621 1551,029621 1551,029621 1551,029621 1551,029621 1551,029621 1551,029621 1551,029621 1551,029621 1551,029621 1551,029621 1551,029621 1551,029621 1551,029621 1551,029621 1551,029621	1983	423,71	425,7856055	234,8322568
1986         368,2         416,5007007         43,68740392           1987         446,84         388,5753503         50,76487742           1988         436,78         352,9976752         52,8844042           1990         383,73         403,7194188         65,14530594           1991         362,34         420,2497094         54,04211569           1992         343,87         400,7598547         57,879061           1993         360,05         392,2449273         31,10431763           1994         384,16         377,2924637         30,02076157           1995         384,07         360,3156159         27,69706187           1996         387,73         360,3156159         25,89496713           1998         294,12         378,153904         15,3713763           1999         278,86         382,941952         31,2499000           2001         271,19         325,545488         47,99838571           2002         310,08         302,202744         47,09838571           2003         363,83         290,746372         24,186382           2004         409,53         280,968186         32,07792752           2005         444,99         295,524093	1984	360,65	442,4728027	233,5593317
1987	1985	317,42	409,2914014	222,3720916
1988         436,78         352,9976752         52,88440424           1989         381,27         360,5988376         52,95751545           1990         383,73         403,7194188         65,14530594           1991         362,34         420,2497094         54,04211563           1992         343,87         400,7598547         57,8790632           1993         360,05         392,2449273         31,10431763           1994         384,16         377,2924637         30,02076157           1995         384,07         360,5812318         27,69706187           1996         387,73         360,3156159         25,894967711           1997         331         372,237808         15,3713763           1998         294,12         378,153904         15,3713763           1999         278,86         382,941952         16,3325477           2000         279,29         356,970976         415,3713763           2001         271,19         325,545488         47,39871016           2003         363,83         290,746372         47,09838573           2004         409,53         280,968186         32,07792758           2005         444,99         295,524093	1986	368,2	416,5007007	43,68740392
1989         381,27         360,5988376         52,95751545           1990         383,73         403,7194188         65,14530594           1991         362,34         420,2497094         54,04211569           1992         343,87         400,7598547         57,8790632           1993         360,05         392,2449273         31,10431763           1994         384,16         377,2924637         30,02076157           1995         384,07         360,5812318         27,69706187           1996         387,73         360,3156159         23,70582163           1998         294,12         378,153904         15,3713763           1999         278,86         382,941952         16,33255477           2000         279,29         356,970976         31,24990005           2001         271,19         325,545488         47,39871016           2003         363,83         290,746372         47,09838572           2004         409,53         280,968186         32,07792758           2005         444,99         295,524093         24,1863821           2007         696,43         369,6035232         62,95418659           2010         1226,66         601,1241904	1987	446,84	388,5753503	50,76487743
1990         383,73         403,7194188         65,14530594           1991         362,34         420,2497094         54,04211569           1992         343,87         400,7598547         57,8790632           1993         360,05         392,2449273         31,10431763           1994         384,16         377,2924637         30,02076155           1995         384,07         360,5812318         27,69706187           1996         387,73         360,3156159         25,89496711           1997         331         372,237808         15,3713763           1999         278,86         382,941952         16,33255473           2000         279,29         356,970976         31,24990005           2001         271,19         325,545488         47,39871016           2002         310,08         302,202744         45,2455723           2003         363,83         290,746372         47,09838573           2004         409,53         280,968186         32,07792758           2005         444,99         295,524093         24,186382           2007         696,43         329,6770465         62,9541865           2008         872,37         407,2967616         <	1988	436,78	352,9976752	52,88440424
1991         362,34         420,2497094         54,04211569           1992         343,87         400,7598547         57,8790632           1993         360,05         392,2449273         31,10431763           1994         384,16         377,2924637         30,02076157           1995         384,07         360,5812318         27,69706187           1996         387,73         360,3156159         25,89496711           1997         331         372,237808         23,70582163           1998         294,12         378,153904         15,3713763           1999         278,86         382,941952         16,33255477           2000         279,29         356,970976         31,24990005           2001         271,19         325,545488         47,39871016           2002         310,08         302,202744         54,24557232           2003         363,83         290,746372         47,09838573           2004         409,53         280,968186         32,07792758           2005         444,99         295,524093         24,1863821           2006         604,34         329,6770465         74,66661903           2009         973,66         505,8183808	1989	381,27	360,5988376	52,95751545
1992         343,87         400,7598547         57,8790632           1993         360,05         392,2449273         31,10431763           1994         384,16         377,2924637         30,02076155           1995         384,07         360,5812318         27,69706187           1996         387,73         360,3156159         25,89496711           1997         331         372,237808         23,70582163           1998         294,12         378,153904         15,3713763           1999         278,86         382,941952         16,33255477           2000         279,29         356,970976         13,24990002           2001         271,19         325,545488         47,39871016           2002         310,08         302,202744         54,2455723           2003         363,83         290,746372         47,09838571           2004         409,53         280,968186         32,07792758           2005         444,99         295,524093         24,1863821           2007         696,43         369,6035232         74,66661903           2008         872,37         407,2967616         74,66661903           2010         1226,66         601,1241904	1990	383,73	403,7194188	65,14530594
1993         360,05         392,2449273         31,10431763           1994         384,16         377,2924637         30,02076157           1995         384,07         360,5812318         27,69706187           1996         387,73         360,3156159         25,89496713           1997         331         372,2378008         23,70582163           1998         294,12         378,153904         15,3713763           1999         278,86         382,941952         16,33255477           2000         279,29         356,970976         31,24990005           2001         271,19         325,545488         47,39871016           2002         310,08         302,202744         47,42457232           2003         363,83         290,746372         47,09838571           2004         409,53         280,968186         32,07792758           2005         444,99         295,524093         24,1863821           2006         604,34         329,6770465         44,33075054           2008         872,37         407,2967616         74,66661903           2010         1226,66         601,1241904         164,1563767           2011         1573,16         736,7470952	1991	362,34	420,2497094	54,04211569
1994         384,16         377,2924637         30,02076157           1995         384,07         360,5812318         27,69706187           1996         387,73         360,3156159         25,89496711           1997         331         372,237808         23,70582163           1998         294,12         378,153904         15,3713763           1999         278,86         382,941952         16,3325547           2000         279,29         356,970976         31,24990005           2001         271,19         325,545488         47,39871016           2002         310,08         302,202744         54,24557232           2003         363,83         290,746372         47,09838573           2004         409,53         280,968186         32,07792758           2005         444,99         295,524093         24,186382           2006         604,34         329,6770465         44,33075054           2007         696,43         369,6035232         62,9541865           2008         872,37         407,2967616         74,6666193           2010         1226,66         601,1241904         164,1563767           2011         1573,16         736,7470952	1992	343,87	400,7598547	57,8790632
1995         384,07         360,5812318         27,69706187           1996         387,73         360,3156159         25,89496711           1997         331         372,237808         23,70582165           1998         294,12         378,153904         15,3713763           1999         278,86         382,941952         16,3325547           2000         279,29         356,970976         31,24990005           2001         271,19         325,545488         47,39871016           2002         310,08         302,202744         54,24557232           2003         363,83         290,746372         47,09838571           2004         409,53         280,968186         32,07792758           2005         444,99         295,524093         24,186382           2006         604,34         329,670465         44,33075054           2007         696,43         369,6035232         62,9541865           2008         872,37         407,2967616         74,6666190           2010         1226,66         601,1241904         164,1563767           2011         1573,16         736,7470952         222,6605162           2013         1409,51         1040,931774	1993	360,05	392,2449273	31,10431763
1996       387,73       360,3156159       25,89496711         1997       331       372,237808       23,70582163         1998       294,12       378,153904       15,3713763         1999       278,86       382,941952       16,33255477         2000       279,29       356,970976       31,24990005         2001       271,19       325,545488       47,39871016         2002       310,08       302,202744       54,24557237         2003       363,83       290,746372       47,09838571         2004       409,53       280,968186       32,07792758         2005       444,99       295,524093       24,1863821         2006       604,34       329,6770465       44,33075054         2007       696,43       369,6035232       62,95418659         2008       872,37       407,2967616       74,66661903         2010       1226,66       601,1241904       164,1563767         2011       1573,16       736,7470952       222,6605162         2012       1668,86       855,2035476       235,2550411         2013       1409,51       1040,931774       298,709396         2014       1266,06       1307,045887       3	1994	384,16	377,2924637	30,02076157
1997         331         372,237808         23,70582163           1998         294,12         378,153904         15,3713763           1999         278,86         382,941952         16,33255477           2000         279,29         356,970976         31,24990005           2001         271,19         325,545488         47,39871016           2002         310,08         302,202744         54,2455723           2003         363,83         290,746372         47,09838573           2004         409,53         280,968186         32,07792758           2005         444,99         295,524093         24,1863823           2006         604,34         329,6770465         44,33075054           2007         696,43         369,6035232         62,95418659           2008         872,37         407,2967616         74,66661903           2010         1226,66         601,1241904         164,1563767           2011         1573,16         736,7470952         222,6605167           2012         1668,86         855,2035476         235,2550411           2013         1409,51         1040,931774         298,709396           2014         1266,06         1307,045887	1995	384,07	360,5812318	27,69706187
1998       294,12       378,153904       15,3713763         1999       278,86       382,941952       16,33255477         2000       279,29       356,970976       31,24990005         2001       271,19       325,545488       47,39871016         2002       310,08       302,202744       54,24557232         2003       363,83       290,746372       47,09838571         2004       409,53       280,968186       32,07792758         2005       444,99       295,524093       24,1863823         2007       696,43       369,6035232       62,95418658         2007       696,43       369,6035232       62,95418658         2008       872,37       407,2967616       74,66661903         2010       1226,66       601,1241904       164,1563767         2011       1573,16       736,7470952       222,6605162         2012       1668,86       855,2035476       235,2550411         2013       1409,51       1040,931774       298,709396         2014       1266,06       1307,045887       398,9045438         2015       1158,86       1487,952943       429,0129105         2016       1251,92       1448,731472	1996	387,73	360,3156159	25,89496711
1999       278,86       382,941952       16,33255477         2000       279,29       356,970976       31,24990005         2001       271,19       325,545488       47,39871016         2002       310,08       302,202744       54,24557232         2003       363,83       290,746372       47,09838573         2004       409,53       280,968186       32,07792758         2005       444,99       295,524093       24,1863821         2007       696,43       369,6035232       44,33075054         2008       872,37       407,2967616       74,66661903         2010       1226,66       505,8183808       130,23779         2010       1226,66       601,1241904       164,156376         2011       1573,16       736,7470952       222,6605162         2012       1668,86       855,2035476       235,2550411         2013       1409,51       1040,931774       298,709396         2014       1266,06       1307,045887       398,9045438         2015       1158,86       1487,952943       429,0129105         2016       1251,92       1448,731472       374,3125395         2018       1260,39       1357,395736	1997	331	372,237808	23,70582163
2000         279,29         356,970976         31,24990005           2001         271,19         325,545488         47,39871016           2002         310,08         302,202744         54,24557232           2003         363,83         290,746372         47,09838571           2004         409,53         280,968186         32,07792758           2005         444,99         295,524093         24,1863821           2007         696,43         329,6770465         44,33075054           2008         872,37         407,2967616         74,66661903           2009         973,66         505,8183808         130,23779           2010         1226,66         601,1241904         164,156376           2011         1573,16         736,7470952         222,6605162           2012         1668,86         855,2035476         235,2550411           2013         1409,51         1040,931774         298,709396           2015         1158,86         1487,952943         429,0129103           2016         1251,92         1448,731472         374,3125396           2018         1268,93         1258,127868         162,2124126           2019         1393,34         1255,023934<	1998	294,12	378,153904	15,3713763
2001       271,19       325,545488       47,39871016         2002       310,08       302,202744       54,24557232         2003       363,83       290,746372       47,09838571         2004       409,53       280,968186       32,07792758         2005       444,99       295,524093       24,1863821         2006       604,34       329,6770465       44,33075054         2007       696,43       369,6035232       62,95418659         2008       872,37       407,2967616       74,66661903         2009       973,66       505,8183808       130,237799         2010       1226,66       601,1241904       164,1563767         2011       1573,16       736,7470952       222,6605162         2012       1668,86       855,2035476       235,2550411         2013       1409,51       1040,931774       298,709396         2014       1266,06       1307,045887       398,9045438         2015       1158,86       1487,952943       429,0129109         2016       1251,92       1448,731472       374,3125396         2017       1260,39       1357,395736       238,3496132         2019       1393,34       1255,023934	1999	278,86	382,941952	16,33255477
2002       310,08       302,202744       54,2455723         2003       363,83       290,746372       47,09838571         2004       409,53       280,968186       32,07792758         2005       444,99       295,524093       24,1863821         2006       604,34       329,6770465       44,33075054         2007       696,43       369,6035232       62,95418659         2008       872,37       407,2967616       74,66661903         2009       973,66       505,8183808       130,237799         2010       1226,66       601,1241904       164,1563767         2011       1573,16       736,7470952       222,6605162         2012       1668,86       855,2035476       235,2550411         2013       1409,51       1040,931774       298,709396         2014       1266,06       1307,045887       398,9045438         2015       1158,86       1487,952943       429,0129109         2016       1251,92       1448,731472       374,3125396         2017       1260,39       1357,395736       238,3496132         2019       1393,34       1255,023934       155,8031264         2020       1773,73       1257,706967	2000	279,29	356,970976	31,24990005
2003         363,83         290,746372         47,09838573           2004         409,53         280,968186         32,07792758           2005         444,99         295,524093         24,1863823           2006         604,34         329,6770465         44,33075054           2007         696,43         369,6035232         62,95418659           2008         872,37         407,2967616         74,66661903           2009         973,66         505,8183808         130,237799           2010         1226,66         601,1241904         164,1563767           2011         1573,16         736,7470952         222,6605162           2012         1668,86         855,2035476         235,2550411           2013         1409,51         1040,931774         298,709396           2014         1266,06         1307,045887         398,9045438           2015         1158,86         1487,952943         429,0129109           2016         1251,92         1448,731472         374,3125399           2017         1260,39         1357,395736         238,3496132           2018         1268,93         1258,127868         162,2124126           2020         1773,73         1257,	2001	271,19	325,545488	47,39871016
2004       409,53       280,968186       32,07792758         2005       444,99       295,524093       24,1863821         2006       604,34       329,6770465       44,33075054         2007       696,43       369,6035232       62,95418659         2008       872,37       407,2967616       74,66661903         2009       973,66       505,8183808       130,237799         2010       1226,66       601,1241904       164,1563767         2011       1573,16       736,7470952       222,6605167         2012       1668,86       855,2035476       235,2550411         2013       1409,51       1040,931774       298,709396         2014       1266,06       1307,045887       398,9045438         2015       1158,86       1487,952943       429,0129109         2016       1251,92       1448,731472       374,3125399         2017       1260,39       1357,395736       238,3496132         2018       1268,93       1258,127868       162,2124126         2020       1773,73       1257,706967       114,7225213         2021       1798,54       1263,318483       8,026804242         1551,029621       267,9635468	2002	310,08	302,202744	54,24557232
2005       444,99       295,524093       24,1863821         2006       604,34       329,6770465       44,33075054         2007       696,43       369,6035232       62,95418659         2008       872,37       407,2967616       74,66661903         2009       973,66       505,8183808       130,237799         2010       1226,66       601,1241904       164,1563767         2011       1573,16       736,7470952       222,6605162         2012       1668,86       855,2035476       235,2550411         2013       1409,51       1040,931774       298,709396         2014       1266,06       1307,045887       398,9045438         2015       1158,86       1487,952943       429,0129109         2016       1251,92       1448,731472       374,312539         2017       1260,39       1357,395736       238,3496132         2018       1268,93       1258,127868       162,2124126         2020       1773,73       1257,706967       114,7225213         2021       1798,54       1263,318483       8,026804242         1551,029621       267,9635465       267,9635465	2003	363,83	290,746372	47,09838571
2006         604,34         329,6770465         44,33075054           2007         696,43         369,6035232         62,95418659           2008         872,37         407,2967616         74,66661903           2009         973,66         505,8183808         130,237799           2010         1226,66         601,1241904         164,1563767           2011         1573,16         736,7470952         222,6605162           2012         1668,86         855,2035476         235,2550411           2013         1409,51         1040,931774         298,709396           2014         1266,06         1307,045887         398,9045438           2015         1158,86         1487,952943         429,0129109           2016         1251,92         1448,731472         374,312539           2017         1260,39         1357,395736         238,3496132           2018         1268,93         1258,127868         162,2124126           2020         1773,73         1257,706967         114,7225213           2021         1798,54         1263,318483         8,026804242           1551,029621         267,9635468         267,9635468	2004	409,53	280,968186	32,07792758
2007       696,43       369,6035232       62,95418659         2008       872,37       407,2967616       74,66661903         2009       973,66       505,8183808       130,237799         2010       1226,66       601,1241904       164,1563767         2011       1573,16       736,7470952       222,6605162         2012       1668,86       855,2035476       235,2550411         2013       1409,51       1040,931774       298,709396         2014       1266,06       1307,045887       398,9045438         2015       1158,86       1487,952943       429,0129109         2016       1251,92       1448,731472       374,3125393         2017       1260,39       1357,395736       238,3496132         2018       1268,93       1258,127868       162,2124126         2020       1773,73       1257,706967       114,7225213         2021       1798,54       1263,318483       8,026804242         1551,029621       267,9635465       267,9635465	2005	444,99	295,524093	24,1863821
2008     872,37     407,2967616     74,66661903       2009     973,66     505,8183808     130,237793       2010     1226,66     601,1241904     164,1563767       2011     1573,16     736,7470952     222,6605162       2012     1668,86     855,2035476     235,2550411       2013     1409,51     1040,931774     298,709396       2014     1266,06     1307,045887     398,9045438       2015     1158,86     1487,952943     429,0129105       2016     1251,92     1448,731472     374,3125395       2017     1260,39     1357,395736     162,2124126       2018     1268,93     1258,127868     162,2124126       2019     1393,34     1255,023934     155,8031264       2020     1773,73     1257,706967     114,7225213       2021     1798,54     1263,318483     8,026804242       1551,029621     267,9635465	2006	604,34	329,6770465	44,33075054
2009     973,66     505,8183808     130,237799       2010     1226,66     601,1241904     164,1563767       2011     1573,16     736,7470952     222,6605162       2012     1668,86     855,2035476     235,2550411       2013     1409,51     1040,931774     298,709396       2014     1266,06     1307,045887     398,9045438       2015     1158,86     1487,952943     429,0129109       2016     1251,92     1448,731472     374,3125399       2017     1260,39     1357,395736     162,2124126       2018     1268,93     1258,127868     162,2124126       2019     1393,34     1255,023934     155,8031264       2020     1773,73     1257,706967     114,7225213       2021     1798,54     1263,318483     8,026804242       1551,029621     267,9635465	2007	696,43	369,6035232	62,95418659
2010         1226,66         601,1241904         164,1563767           2011         1573,16         736,7470952         222,6605162           2012         1668,86         855,2035476         235,2550411           2013         1409,51         1040,931774         298,709396           2014         1266,06         1307,045887         398,9045438           2015         1158,86         1487,952943         429,0129109           2016         1251,92         1448,731472         374,3125399           2017         1260,39         1357,395736         238,3496132           2018         1268,93         1258,127868         162,2124126           2019         1393,34         1255,023934         155,8031264           2020         1773,73         1257,706967         114,7225213           2021         1798,54         1263,318483         8,026804242           1551,029621         267,9635465         267,9635465	2008	872,37	407,2967616	74,66661903
2011     1573,16     736,7470952     222,6605162       2012     1668,86     855,2035476     235,2550411       2013     1409,51     1040,931774     298,709396       2014     1266,06     1307,045887     398,9045438       2015     1158,86     1487,952943     429,0129109       2016     1251,92     1448,731472     374,3125396       2017     1260,39     1357,395736     238,3496132       2018     1268,93     1258,127868     162,2124126       2019     1393,34     1255,023934     155,8031264       2020     1773,73     1257,706967     114,7225213       2021     1798,54     1263,318483     8,026804242       1551,029621     267,9635465	2009	973,66	505,8183808	130,237799
2012       1668,86       855,2035476       235,2550411         2013       1409,51       1040,931774       298,709396         2014       1266,06       1307,045887       398,9045438         2015       1158,86       1487,952943       429,0129109         2016       1251,92       1448,731472       374,3125399         2017       1260,39       1357,395736       238,3496132         2018       1268,93       1258,127868       162,2124126         2019       1393,34       1255,023934       155,8031264         2020       1773,73       1257,706967       114,7225213         2021       1798,54       1263,318483       8,026804242         1551,029621       267,9635465       267,9635465	2010	1226,66	601,1241904	164,1563767
2013     1409,51     1040,931774     298,709396       2014     1266,06     1307,045887     398,9045438       2015     1158,86     1487,952943     429,0129109       2016     1251,92     1448,731472     374,3125399       2017     1260,39     1357,395736     238,3496132       2018     1268,93     1258,127868     162,2124126       2019     1393,34     1255,023934     155,8031264       2020     1773,73     1257,706967     114,7225213       2021     1798,54     1263,318483     8,026804242       1551,029621     267,9635465	2011	1573,16	736,7470952	222,6605162
2014     1266,06     1307,045887     398,9045438       2015     1158,86     1487,952943     429,0129109       2016     1251,92     1448,731472     374,3125399       2017     1260,39     1357,395736     238,3496132       2018     1268,93     1258,127868     162,2124126       2019     1393,34     1255,023934     155,8031264       2020     1773,73     1257,706967     114,7225213       2021     1798,54     1263,318483     8,026804242       1551,029621     267,9635465	2012	1668,86	855,2035476	235,2550411
2015     1158,86     1487,952943     429,0129109       2016     1251,92     1448,731472     374,3125399       2017     1260,39     1357,395736     238,3496132       2018     1268,93     1258,127868     162,2124126       2019     1393,34     1255,023934     155,8031264       2020     1773,73     1257,706967     114,7225213       2021     1798,54     1263,318483     8,026804242       1551,029621     267,9635465	2013	1409,51	1040,931774	298,709396
2016     1251,92     1448,731472     374,3125399       2017     1260,39     1357,395736     238,3496132       2018     1268,93     1258,127868     162,2124126       2019     1393,34     1255,023934     155,8031264       2020     1773,73     1257,706967     114,7225213       2021     1798,54     1263,318483     8,026804242       1551,029621     267,9635465	2014	1266,06	1307,045887	398,9045438
2017     1260,39     1357,395736     238,3496132       2018     1268,93     1258,127868     162,2124126       2019     1393,34     1255,023934     155,8031264       2020     1773,73     1257,706967     114,7225213       2021     1798,54     1263,318483     8,026804242       1328,329242     75,41075496       1551,029621     267,9635465	2015	1158,86	1487,952943	429,0129109
2018     1268,93     1258,127868     162,2124126       2019     1393,34     1255,023934     155,8031264       2020     1773,73     1257,706967     114,7225213       2021     1798,54     1263,318483     8,026804242       1328,329242     75,41075496       1551,029621     267,9635465	2016	1251,92	1448,731472	374,3125399
2018     1268,93     1258,127868     162,2124126       2019     1393,34     1255,023934     155,8031264       2020     1773,73     1257,706967     114,7225213       2021     1798,54     1263,318483     8,026804242       1328,329242     75,41075496       1551,029621     267,9635465	2017	1260,39	1357,395736	238,3496132
2020 1773,73 1257,706967 114,7225213 2021 1798,54 1263,318483 8,026804242 1328,329242 75,41075496 1551,029621 267,9635465	2018	1268,93		
2021 1798,54 1263,318483 8,026804242 1328,329242 75,41075496 1551,029621 267,9635465	2019	1393,34	1255,023934	155,8031264
2021 1798,54 1263,318483 8,026804242 1328,329242 75,41075496 1551,029621 267,9635465	2020	1773,73	1257,706967	114,7225213
1551,029621 267,9635465	2021	1798,54	1263,318483	8,026804242
· · · · · · · · · · · · · · · · · · ·			1328,329242	75,41075496
			1551,029621	267,9635465
2022 1674,78481 303,6164345	2022		1674,78481	303,6164345

# **Moving Average**



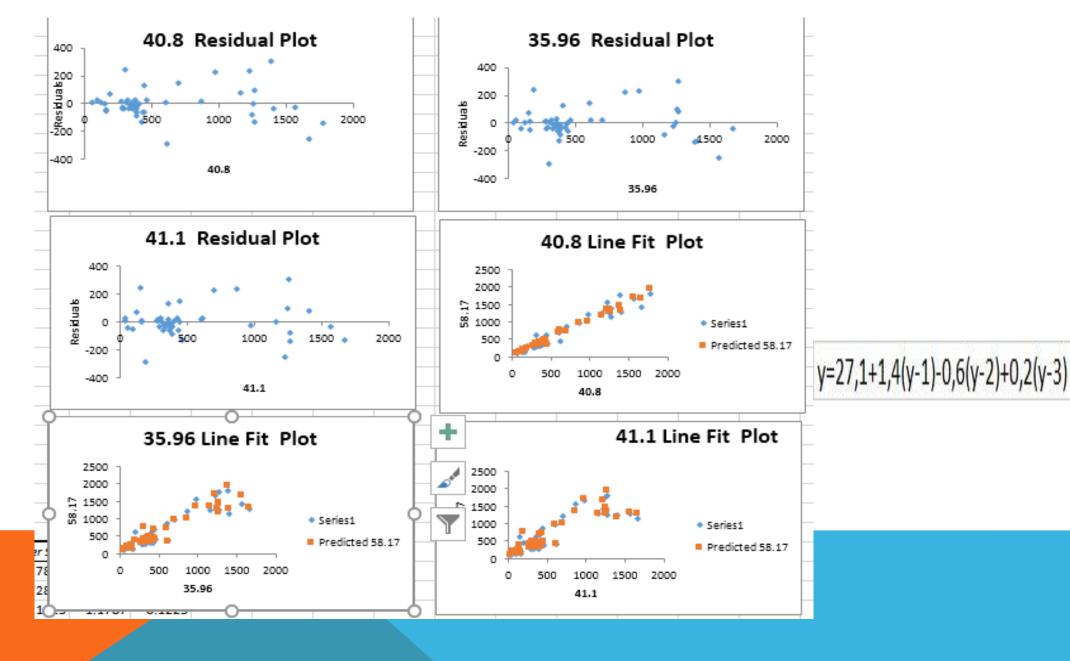
### 2022 1674,785 303,6164

### **Exponential Smoothing**



58.17	40.8	35.96	41.1
97.12	58.17	40.8	35.96
158.76	97.12	58.17	40.8
160.87	158.76	97.12	58.17
124.8	160.87	158.76	97.12
147.84	124.8	160.87	158.76
193.57	147.84	124.8	160.87
307.01	193.57	147.84	124.8
614.75	307.01	193.57	147.84
459.16	614.75	307.01	193.57
376.11	459.16	614.75	307.01
423.71	376.11	459.16	614.75
360.65	423.71	376.11	459.16
317.42	360.65	423.71	376.11
368.2	317.42	360.65	423.71
446.84	368.2	317.42	360.65
436.78	446.84	368.2	317.42
381.27	436.78	446.84	368.2
383.73	381.27	436.78	446.84
362.34	383.73	381.27	436.78
343.87	362.34	383.73	381.27
360.05	343.87	362.34	383.73
384.16	360.05	343.87	362.34
384.07	384.16	360.05	343.87
387.73	384.07	384.16	360.05
331	387.73	384.07	384.16
294.12	331	387.73	384.07
278.86	294.12	331	387.73
279.29	278.86	294.12	331
271.19	279.29	278.86	294.12
310.08	271.19	279.29	278.86
363.83	310.08	271.19	279.29
409.53	363.83	310.08	271.19
444.99	409.53	363.83	310.08
604.34	444.99	409.53	363.83
696.43	604.34	444.99	409.53
872.37	696.43	604.34	444.99
973.66	872.37	696.43	604.34
1226.66	973.66	872.37	696.43
1573.16	1226.66	973.66	872.37
1668.86	1573.16	1226.66	973.66
1409.51	1668.86	1573.16	1226.7
1266.06	1409.51	1668.86	1573.2
1158.86	1266.06	1409.51	1668.9
1251.92	1158.86	1266.06	1409.5
1260.39	1251.92	1158.86	1266.1
1268.93	1260.39	1251.92	1158.9
1393.34	1268.93	1260.39	1251.9
1773.73	1393.34	1268.93	1260.4
1798.54	1773.73	1393.34	1268.9
1100.04	1110.10	1000.07	1200.0

SUMMARY OUTPUT								
Regression Statistics								
Multiple R	0.97571							
R Square	0.95201							
Adjusted R Square	0.94881							
Standard Error	111.047							
Observations	49							
ANOVA								
	df	SS	MS	F	gnificance	F		
Regression	3	1.1E+07	3669064	297.539	1.1E-29			
Residual	45	554911	12331.4					
Total	48	1.2E+07						
	Coefficients	andard Err	t Stat	P-value	Lower 95%	Upper 95%	ower 95.09	pper 95.0%
Intercept	27.1334	26.1404	1.03799	0.30482	-25.516	79.7829	-25.516	79.7829
40.8	1.42877	0.14898	9.59043	0.25622	1.12871	1.72883	1.12871	1.72883
35.96	-0.6505	0.26227	-2.4803	0.01693	-1.1787	-0.1223	-1.1787	-0.1223
41.1	0.22055	0.16826	1.31083	0.19657	-0.1183	0.55944	-0.1183	0.55944



# **THANKS!**