

Testing the variance differences between the revenue returns of artificial intelligence companies Microsoft and IBM

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Abstract : : One of the most profitable industries in recent years is the software industry. Software-based companies can become high-value franchises, but they require sustained investment. Most of these new companies require investments of 25-35% of revenue over three to five years before they start generating profits. Microsoft and IBM have recently emerged as the largest software companies, so this study aims to compare their profits and financial policies. The study found that there were no differences in the average income of the two companies for 23 years, except for four years in which there were different differences

Keywords : artificial intelligence companies. Microsoft and IBM. Testing the variance differences. the revenue returns.

Jel Classification Codes : D3. F2

1. INTRODUCTION

Bill Gates and his colleague Paul Allen founded the company in April 1975. Gates and his colleague registered the trademark “Microsoft” on November 26, 1976.

One of the most important reasons that helped Microsoft quickly dominate the world of software is the boom in the spread of personal computers in the 1980s, and the company’s monopoly on the largest global product of information software “Windows”, which supplied more than 90% of the world’s computers with it, and to which the group of programs created by the company was linked.

After the company completed its tenth year, Bill Gates, the founder of the company, decided to list it on the NASDAQ Stock Exchange, and that was on March 13, 1986.

It signed acquisition deals, the most prominent of which was the purchase of Skype in 2011 for \$ 8.5 billion. The company is 39 years old today.

Throughout its 39-year history, Microsoft has acquired more than 150 companies: including Hotmail, Skype, Vision Corporation and Yammer.

Microsoft started with only three employees and \$ 16,000 in the bank. By 2008, the company employed more than 96,000 and generated \$ 60 billion in revenue.

More than 76 percent of the company's workforce is male, while only 23 percent is female. The average employee age is 38.4 years.

Microsoft files 3,000 patents a year and owns more than 10,000 patents, making it one of the top five patent holders in the United States.

Microsoft Research employs more than 850 PhDs who work in 13 of the company's labs around the world, and are active in more than 55 areas of research and development, including hardware development, social computing, and more.

Six months before Google acquired YouTube for \$1.6 billion, Microsoft offered \$500 million to buy it!.

2. Important Acquisitions

Acquisitions have played a crucial role in Microsoft's history of success. Each deal carried with it a unique success story and contributed to expanding the company's vision. A prominent example is Microsoft's acquisition of LinkedIn in 2016.

Its acquisition of GitHub, the world's largest software development platform, enabled Microsoft to reach a wide community of developers and programmers.

The total number of Microsoft employees is several 211,000, and they work in the company's branches around the world.

According to data collected from Statista, the total number of Microsoft employees reached 221,000 employees in 2022. Of this number, 60% of employees were located in the United States.

On January 18, 2023, Microsoft announced that it would lay off 10,000 employees in the first quarter of 2023. This decrease will affect 5.00% of the workforce worldwide, and cost the company \$ 1.2 billion in expenses on employee separation and organizational reorganization.

Based on this announcement, Microsoft's total employee count as of January 23, 2023 is 211,000.

Microsoft posted its strongest revenue growth since 2022, driven by interest in new AI products that are driving renewed cloud spending.

Revenue in the second quarter, which ended in December 2023, rose 18% to \$62 billion, better than expected. Quarterly net profit also grew 33% to \$21.9 billion.

Azure cloud sales rose 30%, beating analysts' expectations of 28% growth.

.3. Microsoft Corporation Dividend Overview)

MSFT dividends are paid every 3 months. The next dividend per share is expected to be \$0.75, buy before August 15th to get your payment. As of today, the dividend yield (TTM)% is 0.72%.

The earnings per share for the last quarter is \$2.95, while the estimate was \$2.94, which represents a surprise of 0.46%. The company's revenue for the same period is \$64.73B, despite the expectations of \$64.38B. The estimated earnings per share for the next quarter is \$3.11, and revenue is expected to reach \$64.53B.

The results of the American technology company showed that revenue in the last quarter of the fiscal year ending June 30 increased by 8% to \$56.2 billion on an annual basis, beating the expectations of \$55.5 billion according to Refinitiv.

Revenue growth came in below 10% for three consecutive quarters for the first time since 2017.

Microsoft's earnings per share were \$2.69 per share during the three months ending in June, above the average expectations of \$2.55.

The company reported net income of \$20.08 billion in the three months ended June, compared with \$16.74 billion in the same period a year earlier.

The company achieved earnings per share of \$2.94, compared with expectations of \$2.82.

Microsoft's revenue reached \$61.86 billion, compared with expectations of \$60.80 billion.

Microsoft's total revenue grew 17% year-over-year in the quarter that ended March 31, according to the statement. Net income, which reached \$21.94 billion, or \$2.94 per share, increased from \$18.30 billion, or \$2.45 per share, in the same quarter last year. The company's Intelligent Cloud segment, which includes Azure public cloud, Windows Server, Nuance and GitHub, generated revenue of \$26.71 billion, up nearly 21% and above the consensus of \$26.26 billion among analysts surveyed by StreetAccount..

4. Founding the giant (IBM)

Founded in 1911 as a Computing-Tabulating-Recording Company, International Business Machines (IBM) needs to keep its finger on the pulse of the development of information technology not to be ousted by younger tech giants like Google, Microsoft, Apple, and Amazon.

With the advent of the internet, IBM needed to widen the spectrum of its products and services to retain its strong position in the tech field. Although the company lost its dominance, having only a 5% market share in 2021, as opposed to 68% shared by Microsoft, Amazon, and Google, it has many spectacular achievements to its credit.

IBM holds more patents than any other technology company and takes pride in employees who have earned five Nobel Prizes, four Turing Awards, five National Medals of Technology, and five National Medals of Science. And it had been the top tech company for longer than any of the titans dominating the market now.

Also called "Big Blue," IBM indeed has an impressive pedigree. After starting to produce hardware at the beginning of the last century, it thrived in this business for decades and became the leading supplier of mainframe computers worldwide.

IBM's gross income had inexorably grown in the last part of the twentieth

century, expanding from \$14.450 billion earned in 1975 to \$71.940 billion made in 1995. The company's revenue skyrocketed to the record level of \$106.9 billion in 2011, after which it has steadily been declining amidst its transition into new technologies and lines of business.

International Business Machines Corporation (IBM) is an American multinational technology and consulting company headquartered in Armonk, New York, with over 350,000 employees serving customers in 170 countries. On October 8, 2020, IBM announced that it was spinning off its Managed Infrastructure Services unit of its Global Technology Services division into a new public company, a move expected to be completed by the end of 2021. IBM produces and sells computer hardware, middleware, and software, and provides hosting and consulting services in areas ranging from mainframes to nanotechnology. It is also a major research organization, holding the record for most U.S. patents issued by a company for 27 consecutive years as of 2020.

IBM's inventions include the floppy disk, hard disk drive, magnetic stripe card, relational database, SQL programming language, Universal Product Code barcode, and dynamic random access memory. IBM's mainframe, represented by the System/360, was the dominant computing platform during the 1960s and 1970s.

IBM, sometimes referred to as Big Blue, is one of the 30 companies listed on the Dow Jones Industrial Average and one of the world's largest employers, with more than 352,600 employees as of 2019. At least 70% of IBM employees, known as "IBMers", are located outside the United States, with the largest number in India.

IBM employees have received five Nobel Prizes, six Turing Awards, ten National Medals of Technology (USA), and five National Medals of Science (USA).

4. RESULTS AND DISCUSSION

The descriptive statistics of the table for income variables for Microsoft and IBM show that the number of recorded observations is 23, and the median for Microsoft is greater than for IBM, representing 94.86957. The same thing shows that the program records a greater degree of deviation relative to Microsoft during the 23 years. Introduction As for the lowest income during the time series, IBM records the lowest income than Microsoft (55), and this

explains IBM’s superiority to Microsoft in terms of revenues during the first years of the time series

The program explains the existence of a strong inverse correlation between the income of IBM and Microsoft.

The Shapiro-Wilk W test for normal data shows that the series under study is subject to a normal distribution, as we find the calculated probability less than the error range alpha equal to 5 percent.

Spearman's rho test shows that the two samples under study are independent from each other, as the probability calculation result is less than 5 percent error.

The variance test shows that there are differences in the average incomes of each of the two companies for the years 2017/2018 respectively and 2015/and also in 2010. These differences are real and not a coincidence, as the value of the total dispersion from the averages that is closest to significance appears at 60.423734, and the value of the total differences appears. The average income for the two companies is 94.869565. The remaining years of the test show zero dispersion in the averages, and therefore there are no differences. The largest dispersion of the average income was recorded for the year 2017, while the smallest dispersion was in 2015, and the value of F was explained and significant.

Table No. 02 For Quarterly Financial Reports

July 2024	March 2024	December 2023	September 2023
(USD)		September 2023	Year-on-Year
Earnings		56.52 billion	12.76%
Diluted Earnings Per Share		2.99	27.23%
Net Profit Margin		39.44%	12.59%
Operating Income		26.89 billion	24.99%
Net Cash Change		45.75 billion	410.98%
Cash On Hand			
Cost Of Revenue		16.3 billion	5.5%

Source: NASDAQ: MSF2024

Table No. 03 The returns of Microsoft and IBM for the period (2002-2024)

Year	Microsoft revenue billion u.s.dollars	IBM revenue billion u.s.dollars	Year	Microsoft revenue billion u.s.dollars	IBM revenue billion u.s.dollars
2024	245	62	2012	73	104
2023	211	61	2011	69	106
2022	198	60	2010	62	99
2021	168	57	2009	58	95
2020	143	55	2008	60	103
2019	125	56	2007	51	98
2018	110	79	2006	44	91
2017	89	79	2005	39	91
2016	85	79	2004	36	96
2015	93	81	2003	32	89
2014	86	92	2002	28	81
2013	77	99			

<https://www.statista.com/topics/1325/ibm/>

<https://www.statista.com/topics/823/microsoft/>

summarize revenuebillionusdollarsmicrosoft revenuebillionusdollarsibm

Variable	Obs	Mean	Std. Dev.	Min	Max
revenuebil~t	23	94.86957	60.42373	28	245
revenuebil~m	23	83.17391	17.00709	55	106

correlate revenuebillionusdollarsmicrosoft revenuebillionusdollarsibm (obs=23)

revenu~t	revenu~m
revenuebil~t	1.0000
revenuebil~m	-0.7848 1.0000

Outputs of Stata version 14

. swilk revenuebillionusdollarsmicrosoft revenuebillionusdollarsibm					
Shapiro-Wilk W test for normal data					
Variable	Obs	W	V	z	Prob>z
revenuebil~t	23	0.87145	3.362	2.466	0.00683
revenuebil~m	23	0.89914	2.638	1.973	0.02427

Outputs of Stata version 14

spearman revenuebillionusdollarsmicrosoft revenuebillionusdollarsibm
Number of obs = 23
Spearman's rho = -0.6439
Test of Ho: revenuebillionusdo~t and revenuebillionusdo~m are independent
Prob > t = 0.0009

Outputs of Stata version 14

. robvar revenuebillionusdollarsmicrosoft, by(revenuebillionusdollarsibm)			
revenue billion u.s.dollars (IBM)	Summary of revenue billion u.s.dollars(Microsoft)		
	Mean	Std. Dev.	Freq.
55	143	0	1
56	125	0	1
57	168	0	1
60	198	0	1
61	211	0	1
62	245	0	1
79	94.666667	13.428825	3
81	60.5	45.961941	2
89	32	0	1
91	41.5	3.5355339	2
92	86	0	1
95	58	0	1
96	36	0	1
98	51	0	1
99	69.5	10.606602	2
103	60	0	1
104	73	0	1
106	69	0	1
Total	94.869565	60.423734	23
W0 = 12.2751358 df(17, 5) Pr > F = 0.00574637			
W50 = 2.2706352 df(17, 5) Pr > F = 0.18579489			
W10 = 12.2751358 df(17, 5) Pr > F = 0.00574637			
. *(1 variable, 32 observations pasted into data editor)			

Fig.1. Charts showing the differences between the revenues of Microsoft and IBM

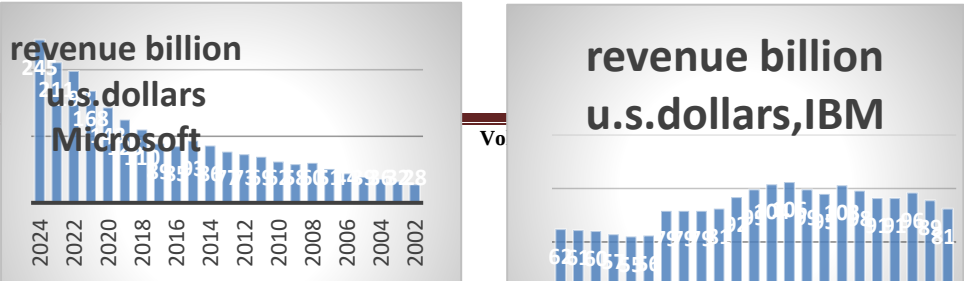
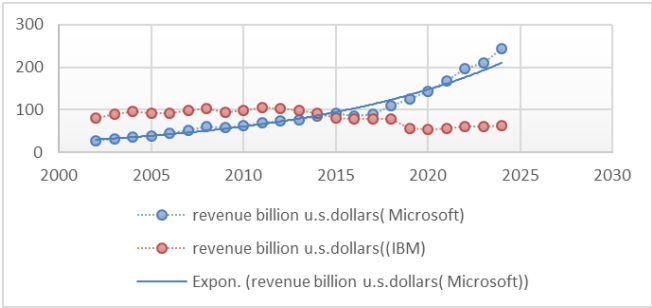
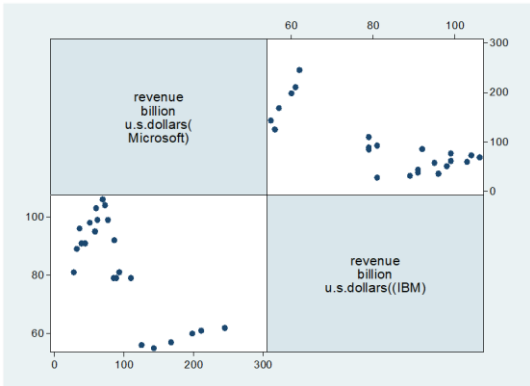


Fig.2. revenue ibm.microsoft



Excel output

Fig.3. A matrix of the benefits and differences between the two AI companies is formed



Stata program outputs

4. CONCLUSION

IBM and Microsoft are considered giants in the computer and cloud software industry, and they share many factors, including a long-term presence in the market, each of them has contributed to the significant development of this industry, each of them has many patents and innovations, they have thousands of branches around the world, they have almost the same policy of expansion through cooperation, then acquisition and swallowing, they have the same structure in the monopolistic competitive market and they also share in achieving huge annual revenues from this sensitive industry, so this study comes as an answer to an obvious question for every researcher, where does the difference between the two companies lie? The study has reached a preliminary answer and is considered the beginning of several upcoming studies, as the study showed the results of the difference in the income of the two companies for a period of 23 years, as the study did not record any variation or difference or differences in the average income achieved by the two companies except in four years, which were 2018, 2017, 20115, 2010, only, which is the opposite of what the graphical representation of the successive income values of the time series showed Which shows the differences recorded from 2015 to 2024.

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revenuebillionusdollarsibm