RELATIVE VALUATION OF WANHUA CHEMICAL GROUP CO., LTD.

TINGOU SHEN

A THEMATIC PAPER SUBMITTED IN PARTIAL
FULFILLMENT OF THE REQUIREMENTS FOR
THE DEGREE OF MASTER OF MANAGEMENT
COLLEGE OF MANAGEMENT
MAHIDOL UNIVERSITY
2025

Thematic paper
entitled

RELATIVE VALUATION OF WANHUA CHEMICAL GROUP CO., LTD.

was submitted to the College of Management, Mahidol University
for the degree of Master of Management
on
3 May 2025

Tingou Shen
.....
Ms. Tingou Shen
Candidate

.....
Assoc. Prof. Simon Zaby,
Ph.D.
Advisor

.....
Prof. Roy Kouwenberg,
Ph.D.
Chairperson

Prattana Punn
.....
Assoc. Prof. Prattana Punnakitikashem,
Ph.D.
Dean
College of Management
Mahidol University

.....
Eakapat Manitkajornkit,
Ph.D.
Committee member

ACKNOWLEDGEMENTS

The successful completion of this thematic paper would not have been achievable without the unwavering support and contributions of several individuals. Their invaluable assistance played a crucial role throughout the research and writing process, and I am sincerely grateful for their encouragement and dedication. Without their involvement, this work could not have come to fruition.

Dr. Simon Zaby-- I sincerely thank you for your steadfast mentorship and dependable support throughout the development of this paper. Your expert guidance and constructive feedback have been essential to its progress and current form. This work could not have reached this stage without your valuable involvement.

My parents-- I am truly grateful for your constant belief in me. Your unwavering love and support have empowered me to face every challenge with confidence. Through your encouragement, I have come to understand the true importance of perseverance and humility.

Tingou Shen

RELATIVE VALUATION OF WANHUA CHEMICAL GROUP CO., LTD.

TINGOU SHEN 6649050

M.M. (CORPORATE FINANACE)

THEMATIC PAPER ADVISORY COMMITTEE: ASSOC. PROF. SIMON ZABY, Ph.D., PROF. ROY KOUWENBERG, Ph.D. EAKAPAT MANITKAJORNKIT, Ph.D.

ABSTRACT

This study conducts a comprehensive relative valuation of Wanhua Chemical Group Co., Ltd. by applying historical multiples, forward-looking multiples, peer comparison, and internal valuation band modeling. Based on 2020–2024 financial data and 2025 forecasts, the analysis systematically estimates Wenhua's reasonable target price and evaluates its market positioning. The selected peer companies include BASF SE, Dow Inc., LyondellBasell Industries N.V., Resonac Holdings Corporation, and Mitsui Chemicals, Inc., which share similarities in business scope, global presence, and industry relevance. While the internal valuation bands serve as a reference to identify pricing anomalies, the final target price is determined using a quantile-based peer comparison method. The resulting 2025 target price is set at RMB 63, representing an upside potential of approximately 14.4% from the 2025 estimated share price of RMB 55.05. A risk matrix highlights key factors such as raw material costs, regulation, and industry cyclicality. Based on integrated valuation outcomes and qualitative risk assessment, this study issues a BUY recommendation, supported by Wenhua's strong earnings resilience, strategic R&D investment, and global market expansion.

KEY WORDS: WANHUA CHEMICAL/ RELATIVE VALUATION/ INVESTMENT RECOMMENDATION/ PEER COMPARISON

49 pages

CONTENTS

CONTENTS (Cont.)

CONTENTS (Cont.)

LIST OF TABLES

LIST OF FIGURES

LIST OF ABBREVIATIONS

Abbreviation	Full Term / Definition
ADI	Aliphatic Diisocyanate
BVPS	Book Value per Share
CAGR	Compound Annual Growth Rate
CBAM	Carbon Border Adjustment Mechanism
CCB	China Construction Bank
CO_2	Carbon Dioxide
COVID-19	Coronavirus Disease 2019
CSI 300	China Securities Index 300
D/E	Debt-to-Equity
E Fund	E Fund Management Co., Ltd.
EBITDA	Earnings Before Interest, Taxes, Depreciation and Amortization
EPS	Earnings Per Share
ESG	Environmental, Social, and Governance
ETF	Exchange-Traded Fund
EU	European Union
EV	Enterprise Value
EV/EBITDA	Enterprise Value to EBITDA
GHG	Greenhouse Gas
ICBC	Industrial and Commercial Bank of China
ISO 14001	International Organization for Standardization – Environmental Management Standard
LPG	Liquefied Petroleum Gas
LYB	LyondellBasell Industries N.V.
MDI	Diphenylmethane Diisocyanate
MS	Methyl Methacrylate-Styrene Copolymer

LIST OF ABBREVIATIONS (cont.)

Abbreviation	Full Term / Definition
NEV	New Energy Vehicle
P/B	Price-to-Book Ratio
P/E	Price-to-Earnings Ratio
PC	Polycarbonate
PE	Polyethylene
PMMA	Polymethyl Methacrylate
PV	Photovoltaic
PVC	Polyvinyl Chloride
R&D	Research and Development
RMB	Renminbi (Chinese Yuan)
ROA	Return on Assets
ROE	Return on Equity
SD	Standard Deviation
SSE	Shanghai Stock Exchange
TDI	Toluene Diisocyanate
Tf S	Together for Sustainability
TPU	Thermoplastic Polyurethane
USD	U.S. Dollar
XLPE	Cross-Linked Polyethylene

CHAPTER I
INTRODUCTION

In this chapter, we present a comprehensive overview of the target company, Wanhua Chemical Group Co., Ltd. The analysis begins with an in-depth examination of the company's key dimensions, including its general introduction (1.1), ownership structure (1.2), global presence (1.3), research and development and innovation (1.4), and its strategic commitment to sustainable development (1.5). This detailed exploration will serve as a foundation for the analysis in the subsequent chapter.

1.1 Introduction to Wanhua Chemical

Wanhua Chemical Group Co., Ltd. (SSE: 600309) was founded on December 20, 1978, and became publicly listed in 2001. Initially established as a state-owned enterprise specializing in the polyurethane industry, the company has evolved into a leading global chemical corporation through years of technological innovation and international expansion. Wanhua Chemical's product portfolio encompasses polyurethane products—including MDI (diphenylmethane diisocyanate), TDI (toluene diisocyanate), and ADI (aliphatic diisocyanate)—as well as polycarbonate (PC), specialty chemicals, and advanced materials. These products are widely used across various industries, including home and living, sports and leisure, automotive and transportation, construction and industrial, electronics and electrical, personal care, and renewable energy.

Wanhua Chemical's core competitive strengths lie in technological innovation, sustainable development, and global expansion. The company has established seven research and development centres across Yantai, Ningbo, Shanghai, Beijing, Shenzhen, Hungary, and Spain, completing a global R&D (research and development) network. Furthermore, it has set up subsidiaries and offices in over ten countries and regions,

including Europe, the United States, and Japan, aiming to provide globally competitive products and comprehensive solutions to its customers (Wanhua Chemical Group, n.d.-a).

Wanhua Chemical, with its diversified business model covering three core segments - polyurethane products, petrochemical products, and fine chemicals and new materials - has formed a relatively complete industrial chain. According to the Major Operating Data for the First Three Quarters of 2024 released by Wanhua Chemical Group (2024), the company's polyurethane products generated sales revenue of RMB (Chinese Yuan) 54.25 billion; petrochemical products and LPG (liquefied petroleum gas) trade contributed RMB 61.98 billion, while the fine chemicals and new materials segment achieved RMB 19.99 billion in revenue (Wanhua Chemical Group, 2024b). Among them, the polyurethane segment remains the company's core growth point, with main products including diphenylmethane diisocyanate (MDI), toluene diisocyanate (TDI), and aliphatic diisocyanate (ADI), which are widely used in the construction, automotive, electronics, and home furnishing industries. In addition, the petrochemical products segment mainly involves the production of ethylene, propylene, polyethylene (PE), and polyolefins, providing important raw materials for the downstream industrial chain and simultaneously enhancing cost control capabilities and industrial chain integration benefits. The fine chemicals and new materials segment focus on high-value-added products, including engineering plastics, bio-based materials, thermoplastic polyurethane (TPU), and specialty amines, to meet the demands of emerging industries such as new energy and biomedicine (Wanhua Chemical Group, n.d.-b).

1.2 Wanhua Chemical's Ownership Structure

Wanhua Chemical Group Co., Ltd. (SSE: 600309) was founded on December 20, 1978, and became publicly listed in 2001. Initially established as a state-owned enterprise specializing in the polyurethane industry, the company has evolved into a leading global chemical corporation through years of technological innovation and international expansion.

Wanhua's product portfolio includes polyurethane products—such as MDI (methylene diphenyl diisocyanate), TDI (toluene diisocyanate), and ADI (aliphatic

diisocyanate)—as well as polycarbonate (PC), specialty chemicals, and advanced materials. These products are widely used in industries such as home and living, sports and leisure, automotive and transportation, construction and industrial sectors, electronics and electrical, personal care, and renewable energy.

The company's core competitive advantages lie in technological innovation, sustainable development, and global expansion. Wanhua has established seven R&D centers located in Yantai, Ningbo, Shanghai, Beijing, Shenzhen, Hungary, and Spain—forming a global R&D network. Moreover, it has subsidiaries and offices in over ten countries and regions, including Europe, the United States, and Japan, aimed at delivering globally competitive products and comprehensive solutions to customers (Wanhua Chemical Group, n.d.-a).

Wanhua operates a diversified business model comprising three core segments: polyurethane products, petrochemical products, and fine chemicals and new materials—enabling a relatively complete industrial chain. According to its operating report for the first three quarters of 2024, the polyurethane segment generated RMB 54.25 billion in revenue; petrochemical products and liquefied petroleum gas trade contributed RMB 61.98 billion, while the fine chemicals and new materials segment achieved RMB 19.99 billion in revenue (Wanhua Chemical Group, 2024a). Among these, the polyurethane segment remains the company's main growth driver. Its core products (MDI, TDI, and ADI) are widely used in the construction, automotive, electronics, and home furnishing industries.

The petrochemical segment primarily involves the production of ethylene, propylene, polyethylene (PE), and polyolefins, which are vital upstream raw materials and enhance both cost-efficiency and industrial integration. The fine chemicals and new materials segment focuses on high value-added offerings such as engineering plastics, bio-based materials, thermoplastic polyurethane (TPU), and specialty amines, targeting the needs of emerging industries like new energy and biomedicine (Wanhua Chemical Group, n.d.-b).

1.2 Ownership Structure of Wanhua Chemical

Wanhua Chemical Group's shareholding structure is diversified, comprising state-owned enterprises, institutional investors, and foreign shareholders. As of September 30, 2024, the top ten shareholders collectively held 61.33% of the company's outstanding A-shares, indicating a relatively concentrated ownership structure (Sohu Finance, 2025).

Among them, Yantai Guotou Investment Holding Co., Ltd. (21.59%) and Yantai Zhongcheng Investment Co., Ltd. (10.52%)—both state-owned enterprises—collectively hold over one-third of the total shares. This suggests substantial government support and a degree of strategic state control. Additionally, Ningbo Zhongkai Xinye Venture Investment Co., Ltd. holds 9.61%, bringing the total shareholding of the top three shareholders to over 41%, thereby strengthening governance stability.

Hong Kong Securities Clearing Company Limited, the fourth-largest shareholder with a 7.70% stake, reflects strong international investor interest, although it has reduced its holdings by 40,580,700 shares—possibly as part of a global asset allocation strategy.

Institutional investors and ETFs (Exchange-Traded Funds) are also well-represented, reinforcing Wanhua's attractiveness in capital markets. For example, Prime Partner International Limited, a foreign institutional investor, holds 5.51% with relatively stable ownership. Notably, several ETFs have increased their positions in Wanhua. The ICBC (Industrial and Commercial Bank of China) —SSE (Shanghai Stock Exchange) 50 ETF holds 1.21%, having added 7,781,200 shares, while the ICBC (Industrial and Commercial Bank of China) —Huatai-PineBridge CSI 300 (China Securities Index 300) ETF holds 1.14%, increasing by 13,498,300 shares. These developments reflect investor confidence in the company's long-term prospects. Additional shareholders include Huatai Securities—Client Credit Trading Guarantee Account (0.96%) and CCB (China Construction Bank) —E Fund (E Fund Management Co., Ltd.) CSI 300 ETF (0.76%), with the former likely representing a margin account and the latter underscoring rising ETF interest in the company.

In summary, Wanhua Chemical's equity structure reveals strong engagement from institutional investors. This broad investor base contributes to governance

stability and reinforces the company's reputation and visibility in the capital markets (Sohu Finance, 2025).

Table 1.1 Top 10 Shareholders of Tradable Shares of Wanhua Chemical

Top 10 Shareholders of tradable Shares - Wanhua Chemical (600309)

Announcement date: 2024-10-29
Report date: 2024-09-30

Rank	Shareholder Name	Shares Held (10,000 shares)	Shareholding Ratio	Shareholding Change	Shareholding Type
1	Yantai Guotou Investment Holdings Co., Ltd.	67,776.47	21.59%	No Change	Circulating A Shares
2	Yantai Zhongcheng Investment Co., Ltd.	33,037.96	10.52%	No Change	Circulating A Shares
3	Ningbo Zhongkai Xinye Venture Capital Co., Ltd.	30,180.84	9.61%	No Change	Circulating A Shares
4	Hong Kong Securities Clearing Company Limited	24,174.07	7.70%	-4058.07	Circulating A Shares
5	Prime Partner International Limited	17,299.32	5.51%	No Change	Circulating A Shares
6	China Securities Finance Corporation Limited	7,334.85	2.34%	No Change	Circulating A Shares
7	Industrial and Commercial Bank of China – SSE 50 ETF	3,801.82	1.21%	+778.12	Circulating A Shares
8	Industrial and Commercial Bank of China – Huatai-PineBridge CSI 300 ETF	3,571.56	1.14%	+1349.83	Circulating A Shares
9	Huatai Securities – Client Credit Trading Guarantee Account	3,006.87	0.96%	New Entry	Circulating A Shares
10	China Construction Bank – E Fund CSI 300 ETF	2,390.89	0.76%	New Entry	Circulating A Shares
	Total	192574.64	61.33%	-0.25%	

Source: SOHU (2025)

1.3 Global Market Presence and Diversification

Wanhua Chemical has built a relatively comprehensive global market network through its strategic international expansion. The company operates multiple manufacturing plants, research and development (R&D) centers, and sales offices across Asia, Europe, and North America. It has established seven integrated production bases located in Yantai, Ningbo, and Fujian (China), as well as in Hungary and the United States. These facilities have significantly enhanced the company's global market penetration through strategic mergers and acquisitions. One of the most notable milestones was the successful acquisition of BorsodChem in Hungary in 2011. This move further strengthened Wanhua's competitive position in the European market by increasing its local production capacity and broadening customer reach. In addition, the company has achieved substantial business growth in Southeast Asia, India, and North America by focusing on high-growth industrial and infrastructure projects—an approach aimed at optimizing its global market share (Wanhua Chemical Group, 2024a).

Figure 1.1 Wanhua Chemical's Locations

Source: Wanhua (2023)

1.4 Research, Development, and Technological Innovation

Wanhua Chemical has consistently maintained substantial investment in research and development (R&D) to drive innovation in advanced materials and green chemical technologies. In 2023, the company's R&D expenditure reached RMB 4.08 billion, contributing to a cumulative total of RMB 14.41 billion over the past five years (Wanhua Chemical Group, 2024a). This sustained commitment to high-intensity R&D has been a critical engine for the company's stable and continuous performance growth.

To reduce dependence on specific markets or product categories and enhance resilience to external risks, Wanhua Chemical has strategically expanded into emerging sectors such as new energy and sustainable chemicals. As of 2023, the company held more than 6,800 patents across domestic and international markets, covering fields including polyurethane, high-performance plastics, and bio-based materials.

Wanhua adopts a comprehensive intellectual property strategy that includes independent research, technology acquisition, and collaborative development, which collectively strengthen technological barriers and consolidate its competitive advantage. Notably, advancements in MDI synthesis technology have further reinforced its leading position in the global market.

In parallel, Wanhua Chemical is actively innovating in the field of green chemistry, with a focus on low-carbon production processes and biodegradable plastics. These initiatives align closely with the company's long-term sustainability goals. Wanhua has announced clear targets for carbon peaking and carbon neutrality, aiming to reach carbon peaking by 2030 and carbon neutrality by 2048 (Wanhua Chemical Group, 2024c).

Furthermore, the company is accelerating the industrial application of polyurethane waste recycling and CO_2 (carbon dioxide) reutilization technologies, supporting the global transition toward a green and circular economy.

1.5 Strategic Outlook

This section outlines Wanhua Chemical's strategic approach, including its marketing strategies, long-term vision, and sustainability initiatives. It provides insights into the company's future direction and highlights its core strategic initiatives aimed at maintaining growth and competitiveness.

1.5.1 Marketing Strategies and Sales Channels

Wanhua Chemical employs a multi-channel sales strategy comprising direct sales, distribution partnerships, and digital platforms to enhance market coverage and improve customer service. Through direct sales, the company establishes long-term partnerships with major global industrial clients to ensure stable supply, while simultaneously expanding its market reach via a regional distribution network. Moreover, Wanhua continually invests in online procurement platforms and digital supply chain solutions to boost operational efficiency and broaden customer engagement. In parallel, the company actively promotes the sustainable development of its brand by incorporating ESG (environmental, social, and corporate governance) principles into its marketing strategies—aligning with the growing preferences of institutional investors for environmentally responsible and sustainable enterprises (Wanhua Chemical Group, 2023a).

1.5.2 Wanhua's Strategic Vision

Wanhua Chemical is committed to maintaining its position as a global leader in chemical innovation through continuous technological advancement, sustainable development, and strategic market expansion. The company has made significant progress by integrating advanced technologies to optimize operations, enhance efficiency, and reduce costs. Key developments include the adoption of new production processes, improved polymer purity, and energy-efficient manufacturing techniques—further solidifying its status as a pioneer in the industry.

The company has also prioritized the development of high-end chemical materials, successfully launching self-developed facilities to produce isocyanate curing agents, polyether amines, and methylamines. These products achieved operational success on their initial start-up. Additionally, Wanhua has introduced new PMMA (Polymethyl Methacrylate) medical-grade products and advanced XLPE (Cross-Linked Polyethylene) and MS (Methyl Methacrylate-Styrene Copolymer) resins through pilot testing, marking steady progress toward industrial-scale production. These innovations have positioned Wanhua strongly as a research-driven chemical company in both traditional and emerging markets (Wanhua Chemical Group, n.d.-b).

As part of its long-term growth strategy, Wanhua is actively expanding into the battery materials sector, focusing on the development of cathodes, anodes, and electrolytes. The company aims to build a comprehensive battery materials ecosystem, thereby reinforcing its role in the global energy transition. Moreover, Wanhua continues to promote sustainable development through strategic investments in new energy solutions, electrochemistry, biosynthesis, and digital intelligence (Wanhua Chemical Group, 2024a).

To accelerate technological advancement, Wanhua has established strong partnerships with universities, research institutions, and key industry players. In 2023 alone, more than 40 new projects were launched, integrating academic research with enterprise resources to enhance scientific innovation. The company filed 1,120 patent applications in both domestic and international markets and secured 982 new authorizations—further strengthening its position as a global industry leader.

From a global supply chain perspective, Wanhua is focused on building an international presence and ensuring supply chain resilience. In 2023, the company adopted a dual strategy of transitioning from short-term collaborations to long-term strategic partnerships, and expanding from a primarily domestic supply model to full-scale global integration. This approach includes investments in big-data-enabled logistics, digital warehousing, and strategic shipping alliances, enabling a more agile, efficient, and cost-effective supply network. These initiatives have helped optimize operations and improve service delivery for customers worldwide.

Overall, Wanhua Chemical's strategic vision is anchored in technological leadership, sustainable innovation, and global expansion. By leveraging cutting-edge R&D, digital transformation, and strong strategic partnerships, the company is shaping the future of the chemical industry. With a clear focus on long-term growth and innovation, Wanhua is well-positioned to further strengthen its role as a global market leader (Wanhua Chemical Group, 2024a).

1.5.3 Wanhua's Sustainable Development

Wanhua Chemical's sustainability strategy is "Advancing Chemistry, Transforming Lives". To achieve the goals, Wanhua has been contributing to the global net zero target. Wanhua is minimizing the impact of its own business on climate, environment and resources and works with partners to promote carbon reduction in the value chain.

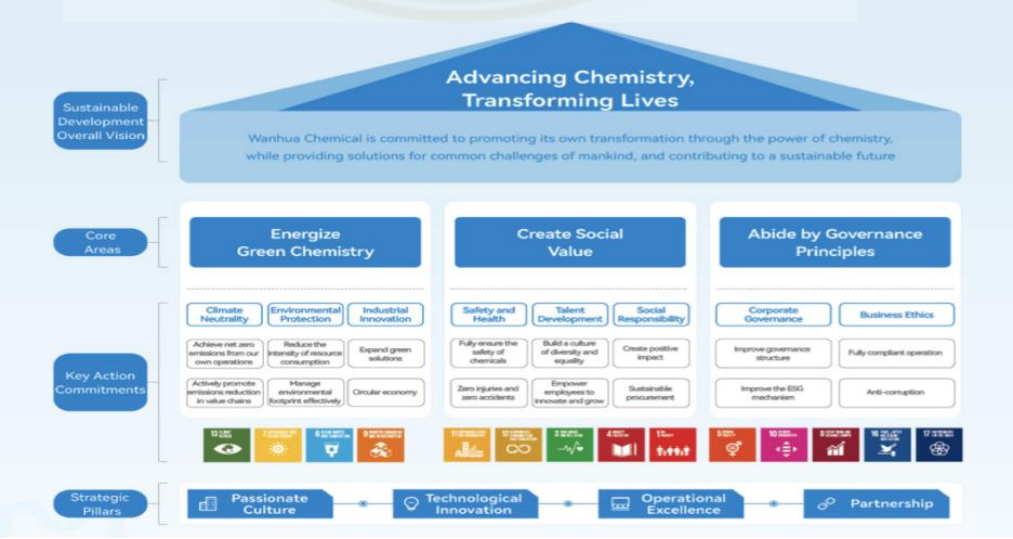

Figure 1.2 Wanhua Chemical's Action Plan to Achieve ESG Strategy

Source: Wanhua (2023, p.15)

Wanhua Chemical has set ambitious climate goals, aiming to peak carbon emissions by 2030 and achieve carbon neutrality by 2048. In 2023, while the company reported an increase in Scope 1 (direct) and Scope 2 (indirect) emissions, its greenhouse gas (GHG) emissions intensity declined—indicating improvements in operational efficiency. The primary sources of Wanhua's emissions include chemical production processes, fuel combustion, steam generation, electricity consumption, and nitrous oxide release. To support its clean energy transition, the company has invested in several large-scale renewable energy projects, such as the Zhaoyuan Agricultural-Photovoltaic (PV) Complementary Project, the Longkou Offshore Wind Power Project, and the Fujian Offshore Wind Power Project. These initiatives play a vital role in reducing overall carbon emissions by increasing the proportion of low-carbon electricity in the company's energy mix (Wanhua Chemical Group, 2024c).

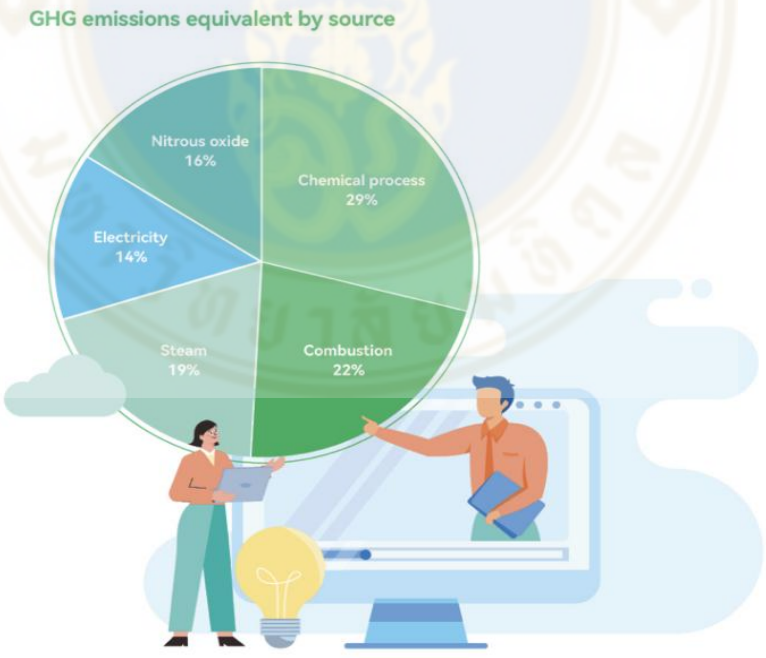

Figure 1.3 Wanhua Chemical's Greenhouse Gas (GHG) Emissions Equivalent by Source

Source: Wanhua (2023, p.22)

Moreover, Wanhua Chemical is prioritizing energy efficiency by achieving annual energy savings and greenhouse gas (GHG) emission reductions through facility upgrades and industrial park integrations. Among its key initiatives is the Hehai Heat Integration Project, which delivers zero-carbon heating without relying on coal combustion (Wanhua Chemical Group, n.d.-b). Other important actions include the hydrogen chloride circulation system, which enhances recycling and overall sustainability, and the Fujian nitric acid electrification project, which significantly reduces emissions in industrial chemical processes.

In the area of sustainable transportation, Wanhua Chemical has launched the "Road to Water" project in collaboration with logistics partners. This initiative seeks to shift freight transport from road to waterway systems, thereby reducing carbon emissions and improving logistics efficiency. The company has also introduced the use of PVC (Polyvinyl Chloride) bulk containers to minimize solid waste generation and lower the overall carbon footprint associated with transportation. These actions reflect Wanhua's continued commitment to sustainability and technological innovation in reducing environmental impacts.

Wanhua Chemical also upholds strong environmental protection standards through strict regulatory compliance, ISO 14001 (International Organization for Standardization – Environmental Management Standard) certification, and a corporate "zero emissions" strategy. The company promotes environmental awareness through employee training, company-wide environmental management initiatives, and over 30 emission reduction projects completed in 2023. Core environmental objectives include minimizing fugitive emissions, enhancing waste gas treatment, and reducing reliance on landfilling.

Water conservation and waste reduction have also become central to Wanhua's operations. In 2023, the company implemented 32 water-saving initiatives that significantly reduced freshwater consumption. The "MDI Waste Brine Recycling" project notably decreased wastewater discharge and associated CO_2 emissions. Investments in advanced wastewater treatment technologies and biodiversity preservation further reinforce Wanhua's sustainable practices.

Additionally, Wanhua Chemical has obtained ISO 9001 certification and continues to promote innovation through the development of eco-friendly products and green building solutions. A standout project in 2023 was the launch of the Wanhua Talent Community—a near-zero-energy residential complex designed to accommodate 3,700 employees. This sustainable housing project integrates renewable energy sources, advanced monitoring systems, and high-performance insulation. It has successfully reduced non-renewable energy usage by 60% and cut CO_2 emissions by more than 10,000 tons per year. Featuring solar photovoltaic (PV) systems, environmentally friendly construction materials, and intelligent climate control, the Wanhua Talent Community sets a new national benchmark for sustainable living and industrial innovation (Wanhua Chemical Group, 2024c).

CHAPTER II
INDUSTRY ANALYSIS: MACROECONOMIC ENVIRONMENT AND BENCHMARK

This chapter presents macroeconomic data related to the chemical industry. Understanding the industry's position within the global market provides insights into the overall dynamics and key factors influencing its growth and development (2.1). Subsequently, an appropriate benchmark company is introduced based on four key selection criteria (2.2).

2.1 Macroeconomic Environment

This section will provide the macroeconomic environment, including market demand for chemicals, sustainable growth and environmental regulation trends. So, we can see the situation and direction of the chemical industry compared with the global.

2.1.1 Competitive Landscape and Market Demand in the Chemical Industry

The global chemical industry is undergoing a period of rapid transformation, characterized by a highly concentrated competitive landscape. Major players in the industry include international giants such as BASF, Dow, and LyondellBasell, as well as leading Chinese enterprises like Wanhua Chemical. These companies have secured dominant positions in the global market by leveraging their advanced technological capabilities, extensive global operations, and large-scale production capacities (Chemical & Engineering News, 2024). In recent years, demand for high-performance chemical products has continued to grow, driven by the expansion of downstream industries such as new energy, electronic manufacturing, and high-end manufacturing. For example, polyurethane, polycarbonate, and other

advanced chemicals are widely used in applications such as automotive light weighting, battery materials, and smart electronics. Wanhua Chemical has further strengthened its competitive position by maintaining global leadership in MDI production—a key raw material for polyurethane—and by continuously expanding into new materials and high-performance plastics (Wanhua Chemical Group, n.d.-a).

2.1.2 ESG and Sustainable Development Competitiveness

Compared to European chemical giants, Wanhua Chemical has steadily strengthened its environmental, social, and governance (ESG) strategy in recent years. The company has actively driven innovation in green chemistry, including the development of low-carbon emission processes and biodegradable plastics, which serve as the technological foundation of its sustainability strategy.

Wanhua Chemical has also made significant progress in supplier management, digital procurement, and green circular procurement by conducting comprehensive evaluations and managing the social responsibility performance of its suppliers. As the first Chinese company to join the *Together for Sustainability* (TfS) initiative, Wanhua actively participates in TfS programs and shares sustainability assessment results of over 20,000 industry suppliers with other TfS member organizations—contributing to enhanced sustainability standards throughout the supply chain. As of 2023, sustainable procurement accounted for 72% of Wanhua Chemical's total supplier spending, and over 80% of its key chemical suppliers had undergone TfS sustainability audits (Wanhua Chemical Group, 2024c).

2.1.3 Industry Competitors and Market Share

Figure 2.1 illustrates that the global chemical industry was valued at USD (U.S. Dollar) 6,182 billion and is projected to reach USD 6,324 billion by 2025, reflecting a compound annual growth rate (CAGR) of 2.3% (MarketsandMarkets, 2025). The industry has expanded at a moderate pace, rebounding from the impact of the COVID-19 (Coronavirus Disease 2019) pandemic and adjusting to the growing demand for sustainable practices. This shift has been driven by the rising need for energy transition materials such as battery chemicals, lightweight materials, and renewable feedstocks.

Additionally, steady demand from the automotive, construction, and electronics sectors has contributed to this growth (Deloitte, 2024).

From 2025 onward, the chemical industry is expected to adapt rapidly as governments around the world introduce stricter policies and incentives related to clean energy, circular economy models, and sustainable manufacturing practices. The Asia-Pacific region is anticipated to remain the dominant market, with China's chemical production forecasted to grow by approximately 5.0%, primarily due to policy-driven demand from the construction and automotive industries. In contrast, Europe is recovering at a slower pace, characterized by low production output and a high reliance on imports. Despite ongoing uncertainties in the global economy, the chemical industry continues to experience growth, propelled by the accelerating shift toward sustainability and the rising demand for specialty chemicals (McKinsey & Company, 2024).

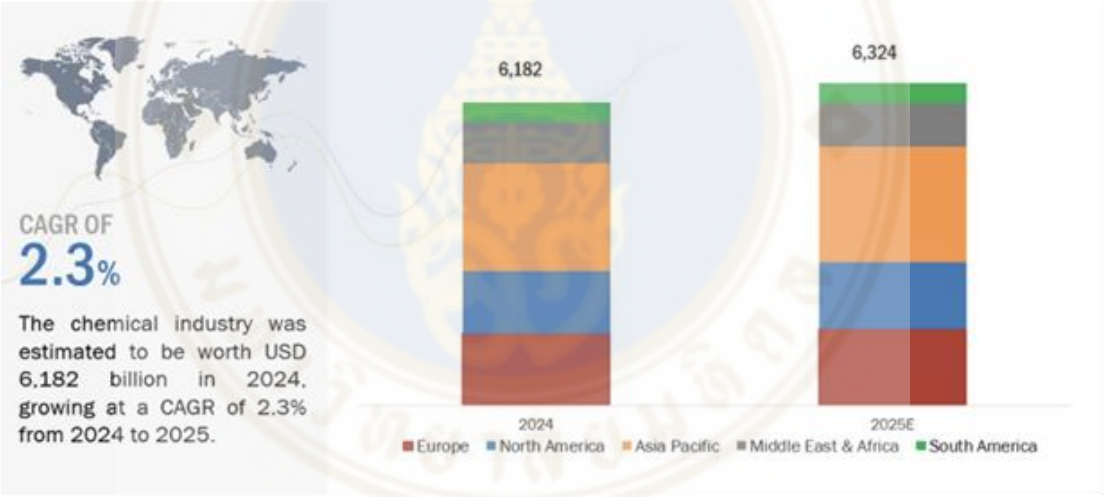

Figure 2.1 The Size of the Global Chemical Industry Classified by Region
Source: Marketsandmarkets (2025)

Green energy is expected to transform the chemical industry by reshaping production processes. Chemical companies are striving to lower carbon emissions and are increasingly adopting renewable energy sources such as solar, wind, and bioenergy. This transition helps them comply with stricter environmental regulations and embrace more eco-friendly operational practices (McKinsey & Company, 2023).

By relying on clean energy, chemical manufacturers can reduce their dependence on fossil fuels, thereby lowering greenhouse gas emissions and achieving

long-term cost savings. This shift is also accelerating the growth of bio-based chemicals and renewable feedstocks, which offer sustainable alternatives to conventional petrochemical products (Denny, 2024).

Although investments in green energy require substantial capital expenditures for new technologies and infrastructure, they also present significant growth opportunities. As consumer demand for sustainable products continues to rise, chemical companies can gain a competitive advantage and strengthen their market position (MarketsandMarkets, 2025).

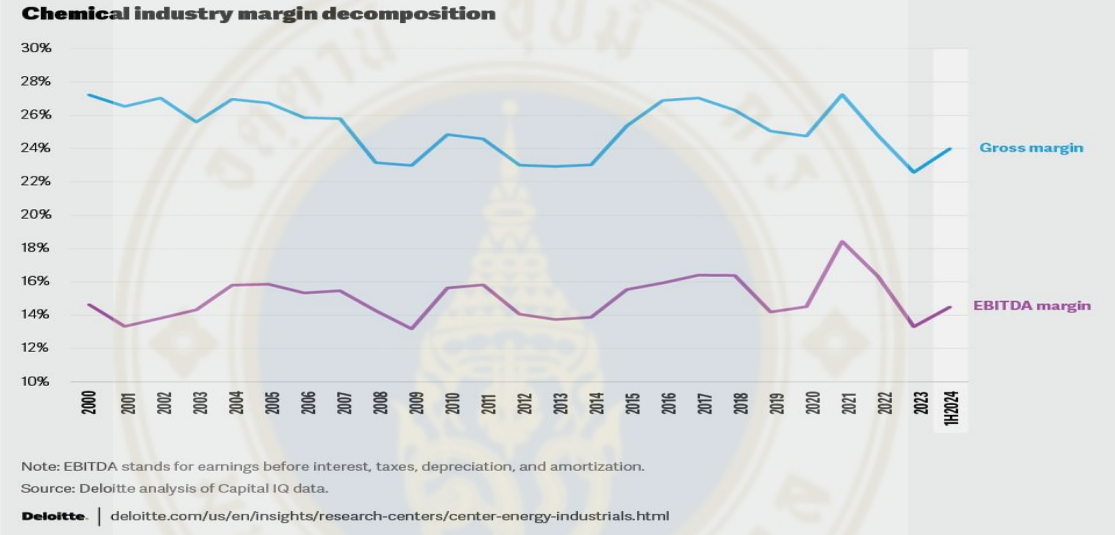

Figure 2.2 Chemical Industry Margin Decomposition

Source: Yankovitz et al. (2024)

In 2024, the chemical industry experienced moderate growth—a trend that is expected to continue as the destocking cycle concludes and product demand rebounds across most segments. To boost revenue, chemical companies have announced cost-cutting plans and are aiming to increase profit margins while simultaneously investing in decarbonization and innovation. By 2025, the industry is expected to sustain its recovery by adapting to new market trends and balancing both short- and long-term strategic goals.

Since the onset of the COVID-19 pandemic in 2020, the chemical industry has faced challenging market conditions. That year, weak demand, reduced production, and lower revenues significantly impacted the sector. However, a recovery

was observed in 2021 and 2022, as demand increased and concerns over supply chain disruptions led to higher inventory levels. By late 2022, however, supply chain pressures eased, leading to a subsequent decline in chemical demand. As a result, by the end of 2023, industry revenues had fallen by 8% year-over-year, and operating margins reached their lowest levels since the Great Recession (2007–2009).

These developments highlighted the need for greater flexibility within the industry, prompting widespread adoption of cost-reduction strategies. While these cost-saving initiatives remain in effect, the first half of 2024 showed encouraging signs of recovery. Gross margins began to rebound, and EBITDA (Earnings Before Interest, Taxes, Depreciation and Amortization) margins also demonstrated an upward trend—indicating a gradual improvement in overall industry performance (Yankovitz et al., 2024).

2.1.4 Trade Policies and Supply Chain Implications

The slowdown in global economic growth, evolving trade policies, and the restructuring of supply chains have significantly impacted Wanhua Chemical's valuation. In the post-pandemic era, global supply chains have shown a clear trend toward regionalization and short-chain localization, driven by ongoing trade tensions and heightened concerns over supply chain security. The U.S.–China trade conflict and the European Union's restrictions on Chinese chemical imports have further complicated the global trade environment. In particular, the EU (European Union) Carbon Border Adjustment Mechanism (CBAM) imposes additional tariffs on products with high carbon emissions (European Commission, 2023), placing cost pressures on companies that primarily rely on bulk chemical exports.

In response to these challenges, Wanhua Chemical has established subsidiaries and offices in Hungary, Spain, the United States, and Japan—mitigating supply chain risks and enhancing localized operational capabilities (Wanhua Chemical Group, 2024a). Through its global footprint, vertically integrated supply chain management, and diversified regional market strategy, the company has effectively minimized the adverse effects of international trade policy fluctuations. These efforts have reinforced its competitive position and contributed to greater valuation stability.

2.1.5 Environmental Regulations and Sustainability Trends

The chemical industry is increasingly subject to stringent environmental regulations and carbon emission policies. Both the European Union's Carbon Border Adjustment Mechanism (CBAM) and China's "Dual Carbon" goals—targeting carbon peaking by 2030 and carbon neutrality by 2060—require enterprises to reduce their carbon footprints. These frameworks are compelling the chemical sector to transition toward low-carbon and environmentally sustainable operations (European Commission, 2023). As an industry leader, Wanhua Chemical has proactively aligned itself with these global sustainability trends by setting ambitious environmental targets, including achieving carbon peaking by 2030 and carbon neutrality by 2048. To support these goals, the company has actively promoted the development of green chemical industrial parks, optimized its energy structure, improved water resource utilization, and enhanced research and development in low-carbon technologies.

Furthermore, China's 14th Five-Year Plan prioritizes the transformation of the chemical sector toward high-end materials and encourages enterprises to invest in new energy materials, electronic chemicals, and eco-friendly coatings. In response, Wanhua Chemical has expanded its presence in specialty chemicals, polyurethane-based advanced materials, and battery materials—positioning itself to capitalize on policy incentives while simultaneously enhancing product competitiveness and long-term valuation potential (Wanhua Chemical Group, 2024c).

2.2 Selecting Benchmark Companies

Selecting appropriate benchmark companies is fundamental to conducting a robust relative valuation. To ensure a meaningful comparison, four key dimensions are considered: industry alignment, financial scale, geographical scope, and operating history. As a global leader in polyurethane, petrochemicals, and fine chemicals, Wanhua Chemical requires peer companies with overlapping business segments, comparable scale, international operations, and an established track record in the chemical industry.

BASF SE (Ticker Symbol: BAS.DE), founded in 1865 and headquartered in Germany, is one of the largest chemical producers globally. With operations in over 90 countries, BASF's business spans materials, industrial solutions, and surface technologies. In 2024, the company reported revenue of approximately USD 71 billion. Its diverse customer base—spanning the automotive, construction, and electronics sectors—makes BASF highly comparable to Wanhua in terms of scale and operational structure (BASF, 2024).

Dow Inc. (Ticker Symbol: DOW), established in 2018 and based in the United States, is another leading global player in materials science. Operating in over 30 countries and generating USD 43 billion in revenue in 2024, Dow focuses on packaging materials, industrial intermediates, and coatings—areas that significantly overlap with Wanhua's product portfolio. The company's global footprint and industrial positioning make it a suitable benchmark for comparative analysis (DOW, 2024).

LyondellBasell Industries N.V. (Ticker Symbol: LYB), founded in 2007 and headquartered in the Netherlands, is a global leader in petrochemicals, polyolefins, and recycling technologies. As of December 30, 2024, its closing share price was USD 73.18, with estimated annual revenue of approximately USD 45 billion. LyondellBasell operates in over 100 countries and specializes in the production of ethylene, propylene, polyethylene, and polypropylene. Its upstream petrochemical integration and strong commitment to circular economy initiatives align closely with Wanhua Chemical's diversified petrochemical and sustainable materials strategies—making it a highly relevant peer for valuation benchmarking (LyondellBasell Industries, 2024).

Resonac Holdings Corporation (Ticker Symbol: 4004.T), established in 2023 through the merger of Showa Denko K.K. (founded in 1939) and Hitachi Chemical (founded in 1912), is a leading Japanese company specializing in petrochemicals, electronic materials, and high-performance ceramics. Resonac's emphasis on innovation-driven growth in advanced materials and electronic chemicals closely parallels Wanhua Chemical's strategic development focus. As such, Resonac provides strong comparability in assessing technological competitiveness and positioning within high-value markets (Resonac Holdings Corporation, 2024).

Mitsui Chemicals Inc. (Ticker Symbol: 4183.T), founded in 1912 and headquartered in Tokyo, is a globally integrated chemical company with operations in over 30 countries. Its core business segments include performance materials, petrochemicals, and functional polymers. The company possesses strong capabilities in R&D and innovation related to high-value-added products. Although smaller in scale compared to Wanhua Chemical, Mitsui's specialization in advanced materials and innovation-driven strategies offers meaningful comparability in terms of technological differentiation and global market presence (Mitsui Chemicals Inc, 2024).

CHAPTER III
FINANCIAL ANALYSIS AND RELATIVE VALUATION

This chapter analyzes the financial status of Wanhua Chemical, focusing on key performance indicators such as asset growth, revenue, and profitability trends (3.1); research and development (R&D) investment and innovation capabilities (3.2); earnings per share (EPS) performance (3.3); and a DuPont analysis comparing Wanhua's profitability and operational efficiency with its industry peers (3.4). By examining factors including the market environment, strategic expansion, technological innovation, and shareholder value creation, this chapter provides a comprehensive assessment of Wanhua Chemical's financial performance and market positioning. The analysis offers data-driven insights into the company's investment potential and competitive standing in the global chemical industry.

3.1 Overview of Financial Growth: Assets, Revenue, and Net Profit

Between 2020 and 2024, Wanhua Chemical exhibited robust growth in total assets, revenue, and net profit.

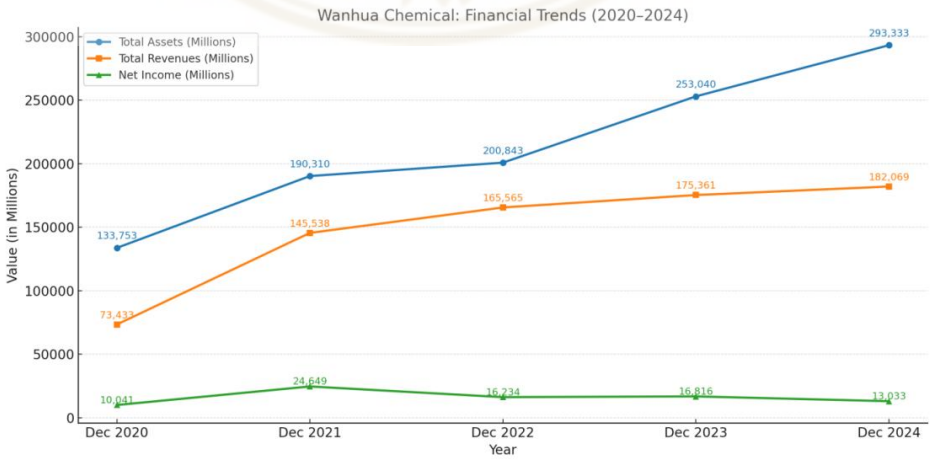

Figure 3.1 Financial Performance of Wanhua Chemical (2019-2023)

Source: Balance sheet & income statement of Wanhua Chemical

Figure 3.1 shows that Wanhua Chemical's total assets expanded significantly to RMB 293,333 million in 2024, up from RMB 253,040 million in 2023 (FinChat, 2024). This growth was primarily driven by globalization strategies, production capacity expansion, and sustained investments in high-value-added chemical businesses. Notably, fixed assets and construction-in-progress continued to represent a substantial proportion of total assets, highlighting the company's long-term strategic focus.

These trends underscore Wanhua Chemical's commitment to large-scale capacity development, reinforcing its position as a leading player in the chemical industry. As a capital-intensive sector, the chemical industry requires companies to enhance production capacity, optimize manufacturing processes, and reduce unit costs to remain competitive. In line with this, Wanhua Chemical has consistently invested in new facility construction and advanced production equipment to meet evolving market demands (Wanhua Chemical Group, 2024a).

Between 2020 and 2024, Wanhua Chemical demonstrated strong financial performance (Echemi, 2024). The company's revenue increased from RMB 73,433 million in 2020 to RMB 182,069 million in 2024, representing a compound annual growth rate (CAGR) of approximately 25.4%. Despite the global economic downturn and disruptions caused by the COVID-19 pandemic in 2020, the company achieved a revenue recovery of nearly 98.2% in 2021—largely driven by expansion in the MDI market and a significant increase in MDI sales volume. As of June 2024, global nominal MDI production capacity reached approximately 10.56 million tons per year, with Wanhua Chemical contributing 3.5 million tons annually, accounting for a 33.1% global market share (Eastmoney Caifuhao, 2024).

However, revenue growth slowed in 2022 and 2023, declining to 13.76% and 5.92%, respectively, due to a sluggish global economic recovery and weakened demand within the chemical sector (International Monetary Fund, 2023). In 2024, revenue growth further decelerated to 2.91%, reaching RMB 182,069 million. This reflects ongoing pressure from market headwinds and a cautious investment sentiment across global end markets. Nevertheless, Wanhua Chemical successfully mitigated these challenges by diversifying its business portfolio—entering the polycarbonate (PC) and toluene diisocyanate (TDI) markets. These strategic expansions enhanced the

company's product offerings and contributed to improved revenue resilience (Wanhua Chemical Group, 2024a).

Currently, Wanhua Chemical is the world's largest supplier of methylene diphenyl diisocyanate (MDI) and toluene diisocyanate (TDI), and the leading exporter of polycarbonate (PC) from China. To mitigate regional market risks, the company has expanded its sales networks in Southeast Asia and Europe, with overseas revenue reaching RMB 79.21 billion in 2023—accounting for approximately 45% of its total revenue.

Wanhua Chemical's net profit peaked at RMB 24,649 million in 2021 before declining to RMB 16,816 million in 2023 and further to RMB 13,033 million in 2024 (Wanhua Chemical Group, 2024; Bloomberg, 2024). This downward trend was largely driven by industry cyclicality, global supply-demand imbalances, and fluctuations in raw material costs. As a global leader in the MDI industry, Wanhua benefits from strong pricing power and significant cost advantages. In 2021, a surge in global raw material prices triggered sharp increases in MDI and TDI product prices, enabling the company to achieve record-breaking profits. However, since 2022, the global economic slowdown, weakened demand in the home appliance and real estate sectors, and declining export activity have led to oversupply in the MDI market, placing downward pressure on prices and compressing profit margins. Additionally, volatility in global energy markets—particularly the persistently high costs of crude oil and natural gas—has driven up production expenses (Eastmoney Caifuhao, 2024).

These pressures persisted into 2024. Despite initial signs of stabilization in China's real estate market and a gradual recovery in consumer durables, overall demand remained subdued, and MDI price recovery was modest. Profitability was further constrained by continued high raw material costs and oversupply conditions. Nevertheless, Wanhua Chemical maintained robust operating cash flow and exercised strategic capital discipline, supporting its long-term financial resilience. Moving forward, the company's focus on high-end materials innovation, international market expansion, and operational efficiency positions it well to capture upcoming cyclical upturns and reinforce its global leadership (McKinsey & Company, 2024).

Looking ahead, global sustainability policies, rising demand for insulation materials in the construction sector, and the rapid expansion of the NEV (New Energy

Vehicle) industry are expected to support long-term demand for MDI and its derivatives. Additionally, Wanhua Chemical is accelerating its entry into high-value-added chemical markets and new energy material sectors—including lithium battery materials, high-performance polyurethane, and specialty chemicals. Compared to its traditional MDI business, these emerging segments offer higher profitability and greater growth potential. With the accelerating development of the global energy transition, these businesses are expected to become key profit drivers, further enhancing Wanhua Chemical's long-term valuation (Eastmoney Caifuhao, 2024).

3.2 Earnings per Share

As illustrated in Figure 3.2, Wanhua Chemical's EPS (Earnings Per Share) from 2020 to 2024 demonstrate a cyclical trend shaped by macroeconomic fluctuations and industry-specific pressures. EPS rose from RMB 3.2 in 2020 to a peak of RMB 7.9 in 2021, supported by record-high profitability fueled by surging MDI and TDI prices. However, following this peak, EPS declined to RMB 5.2 in 2022, RMB 5.4 in 2023, and further to RMB 4.2 in 2024 (FinChat, 2024). This downward trajectory reflects margin compression driven by slower global demand recovery, rising input costs, and persistent oversupply across core product segments (International Monetary Fund, 2023).

From a valuation standpoint, although the recent contraction in EPS may dampen short-term investor sentiment, Wanhua Chemical's strong operational fundamentals, disciplined capital management, and leadership in global chemical markets underpin its ability to recover earnings over time. In the long term, the company's strategic diversification, market dominance in MDI and TDI, and continued innovation in high-performance materials are expected to serve as key drivers of renewed EPS growth. Accordingly, Wanhua retains the potential to command a premium valuation relative to its peers, reinforcing a favorable long-term investment outlook (Eastmoney Securities, 2024).

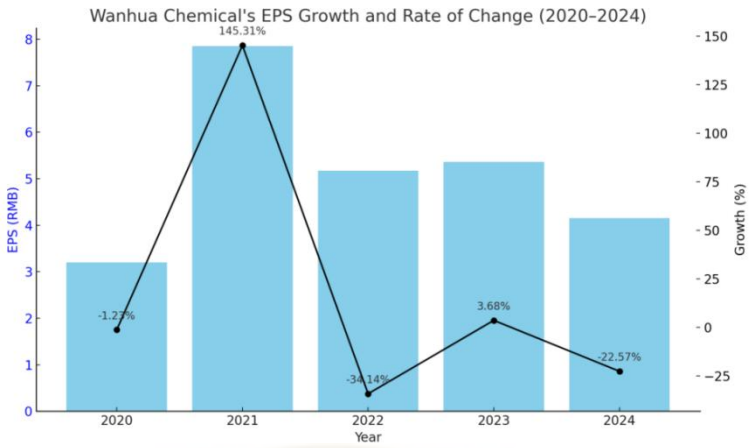

Figure 3.2 EPS Growth Chart (2020-2024) for Wanhua Chemical

Source: Finchat

3.3 Research and Development Expense

Over the past five years, Wanhua Chemical has steadily increased its investment in R&D (Research and Development), rising from CNY 2.04 billion in 2020 to CNY 4.55 billion in 2024. This consistent growth underscores the company's strong commitment to innovation as a core driver of competitiveness. Wanhua now holds over 7,700 domestic and international invention patents and employs more than 4,000 scientific researchers, who continue to develop advanced technologies aimed at reducing costs and meeting evolving customer needs.

In 2023, Wanhua launched the "Year of Projects" initiative, which focused on post-project evaluation, competitiveness analysis, and economic return assessments. Through this initiative, the company strengthened its fixed asset investment management by upgrading internal systems, enforcing strict cost control, and implementing lean construction practices. As a result, Wanhua achieved cost savings of CNY 1.505 billion across various departments. These efforts highlight the company's strategic emphasis on technological leadership and operational efficiency (Wanhua Chemical Group, 2024a).

Table 3.1 Research and Development Expense of Wanhua Chemical (2019-2023)

Billion CNY	2020	2021	2022	2023	2024

R&D Expense	2.04	3.17	3.42	4.08	4.55

Source: Income statement of Wanhua Chemical

3.4 Dupont Analysis with competing companies

To comprehensively assess the quality of earnings and Wanhua Chemical's positioning within the global chemical industry, this section applies the DuPont analysis framework. The analysis decomposes return on equity (ROE) into its three key components: return on assets (ROA), leverage ratio, and net income margin, over the period from 2020 to 2024. Wanhua Chemical's performance is then compared with five major global competitors to evaluate relative profitability, operational efficiency, and capital structure effectiveness.

Table 3.2 DuPont Analysis of Wanhua Chemical and Key Competitors (2019-2023)

Wanhua	**2020 Y**	**2021 Y**	**2022 Y**	**2023 Y**	**2024 Y**
ROA	8.71%	15.21%	8.30%	7.41%	4.77%
Leverage Ratio	2.53	2.76	2.69	2.74	2.98
Net Income Margin	13.67%	16.94%	9.80%	9.59%	7.16%
DuPont ROE	22.04%	41.98%	22.33%	20.30%	14.21%
BASF SE	**2020 Y**	**2021 Y**	**2022 Y**	**2023 Y**	**2024 Y**
ROA	-1.27%	6.59%	-0.73%	0.28%	1.65%
Leverage Ratio	2.22	2.25	2.14	2.16	2.18
Net Income Margin	-1.79%	7.03%	-0.72%	0.25%	1.47%
DuPont ROE	-2.82%	14.83%	-1.56%	0.60%	3.60%
Resonac	**2020 Y**	**2021 Y**	**2022 Y**	**2023 Y**	**2024 Y**
ROA	-4.65%	-0.56%	1.45%	-0.92%	3.50%
Leverage Ratio	3.07	2.62	3.65	3.51	3.81
Net Income Margin	-8.84%	-1.89%	2.61%	-1.33%	2.85%
DuPont ROE	-14.27%	-1.47%	5.30%	-3.23%	10.99%
LyondellBasell N.V	**2020 Y**	**2021 Y**	**2022 Y**	**2023 Y**	**2024 Y**
ROA	4.31%	15.55%	10.62%	5.76%	3.74%
Leverage Ratio	4.43	3.06	2.85	2.83	2.84
Net Income Margin	5.12%	12.15%	7.69%	5.14%	3.37%
DuPont ROE	19.10%	47.66%	30.31%	13.54%	10.62%
Dow Inc.	**2020 Y**	**2021 Y**	**2022 Y**	**2023 Y**	**2024 Y**

ROA	2.01%	10.14%	7.41%	0.99%	1.94%
Leverage Ratio	4.70	4.07	3.18	3.02	3.21
Net Income Margin	3.18%	11.48%	8.05%	1.60%	2.32%
DuPont ROE	9.45%	41.27%	23.56%	2.99%	6.23%

Table 3.2 DuPont Analysis of Wanhua Chemical and Key Competitors (2019-2023) (cont.)

Mitsui Chemicals	**2020 Y**	**2021 Y**	**2022 Y**	**2023 Y**	**2024 Y**
ROA	2.55%	3.81%	3.60%	1.46%	2.33%
Leverage Ratio	2.89	2.28	2.44	2.55	2.78
Net Income Margin	2.83%	4.78%	6.82%	4.41%	2.86%
DuPont ROE	7.37%	8.70%	15.10%	9.69%	5.24%

Source: Bloomberg Terminal and calculation

The data reveal that Wanhua Chemical consistently delivers a relatively high return on equity (ROE) compared to its peers, peaking at 41.98% in 2021 (Bloomberg, 2024). This strong performance is primarily driven by a high net profit margin and a stable leverage structure, indicating that the company's profitability is rooted in operational efficiency rather than financial leverage.

In comparison, LyondellBasell and Dow Inc. also reported relatively strong ROE figures in 2021, largely attributed to improved profit margins during the industry upcycle. However, their ROE declined sharply in subsequent years, highlighting greater sensitivity to macroeconomic fluctuations. BASF SE and Resonac exhibited weaker return on assets (ROA) and fluctuating margins, resulting in less stable ROE performance. Mitsui Chemicals, meanwhile, maintained moderate yet stable ROE levels, supported by a conservative leverage profile. Wanhua Chemical's prudent management of leverage, combined with its superior profitability, underscores the quality and sustainability of its earnings structure. The updated DuPont indicators further reinforce that Wanhua's strong ROE is primarily driven by fundamental operational strength rather than reliance on financial leverage (Deloitte, 2024).

Overall, Wanhua Chemical's consistent and resilient profitability advantage relative to its peers provides a solid foundation for its relative valuation premium. These findings support the positive investment outlook discussed in the following chapters.

CHAPTER IV
RELATIVE VALUATION

Based on the relative valuation framework proposed by Damodaran (2012), this chapter assesses the market value of Wanhua Chemical using a multi-method approach. The analysis is structured into four parts: (4.1) reviewing historical valuation multiples from 2020 to 2024—including P/E (Price-to-Earnings Ratio), P/B (Price-to-Book Ratio), and EV/EBITDA (Enterprise Value to EBITDA) bands—to understand pricing trends and market sentiment; (4.2) forecasting forward valuation multiples over the same period based on projected financial performance to evaluate revaluation potential; (4.3) estimates internal valuation-based target prices; (4.4) summarizing the key financial metrics of comparable companies to establish a benchmarking framework; and (4.5) applying the comparable company valuation method, using peer multiples combined with trailing, forward, and quantile sensitivity approaches to estimate a reasonable target price range. (4.6) summarizes results and sets a final target price based on median peer multiples. This chapter aims to determine whether Wanhua Chemical's current valuation is reasonable, identify valuation gaps, and provide a quantitative basis for the investment recommendation.

4.1 Historical valuation multiple analysis 2020-2024

Wanhua Chemical's valuation multiples have exhibited significant fluctuations over the past five years. The key metrics include the price-to-earnings ratio (P/E), price-to-book ratio (P/B), and enterprise value to EBITDA ratio (EV/EBITDA).

4.1.1 Trailing P/E Band

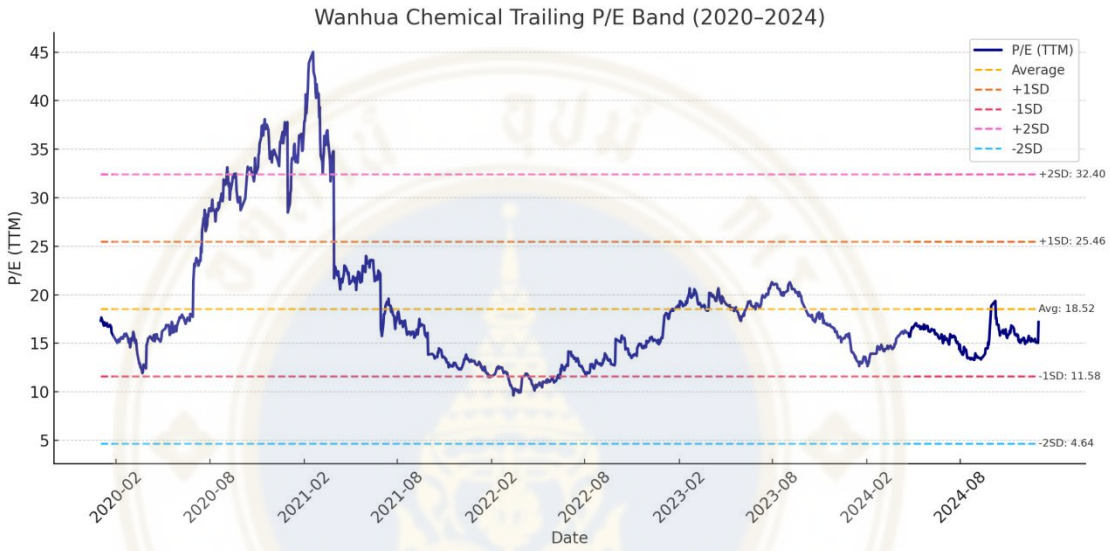

Figure 4.1 Wanhua Chemical Trailing P/E Band (2020–2024)

Source: iFind and PyCharm

As of the end of 2024, Wanhua Chemical's trailing price-to-earnings (P/E) ratio stands at 17.19, slightly below its five-year average of 18.52 and nearing the −1standard deviation (SD) threshold. This indicates relatively conservative market expectations regarding the firm's earnings prospects. Historically, Wanhua's P/E ratio spiked above 45x in early 2021, reflecting highly optimistic sentiment, but began to normalize throughout 2022 and 2023 (iFind, 2024).

The ongoing contraction in valuation range suggests a more rational pricing phase. Should the company continue to deliver solid earnings or positive guidance, the current level may represent a potential revaluation opportunity. Overall, the P/E trend not only reflects shifts in profitability outlook but also investor sentiment

dynamics, aligning with the concept that valuation multiples are influenced by both fundamentals and market psychology (Koller et al., 2020).

4.1.2 Trailing P/B Band

By late 2024, Wanhua Chemical's Price-to-Book Ratio (P/B) ratio had dropped to 2.40, well below the five-year average of 4.25 and falling below the –1standard deviation (SD) threshold of 2.78, though still above –2 standard deviation (SD). This indicates that the decline in stock price has outpaced growth in book value, suggesting that the market may be undervaluing the company's underlying assets (iFind, 2024). Back in early 2021, the ratio surged past 10x amid abundant liquidity and optimistic sentiment, but it has gradually corrected in line with tighter monetary conditions and a cooling chemicals market. If Wanhua sustains strong return on equity, this multiple could normalize over time (International Monetary Fund, 2023).

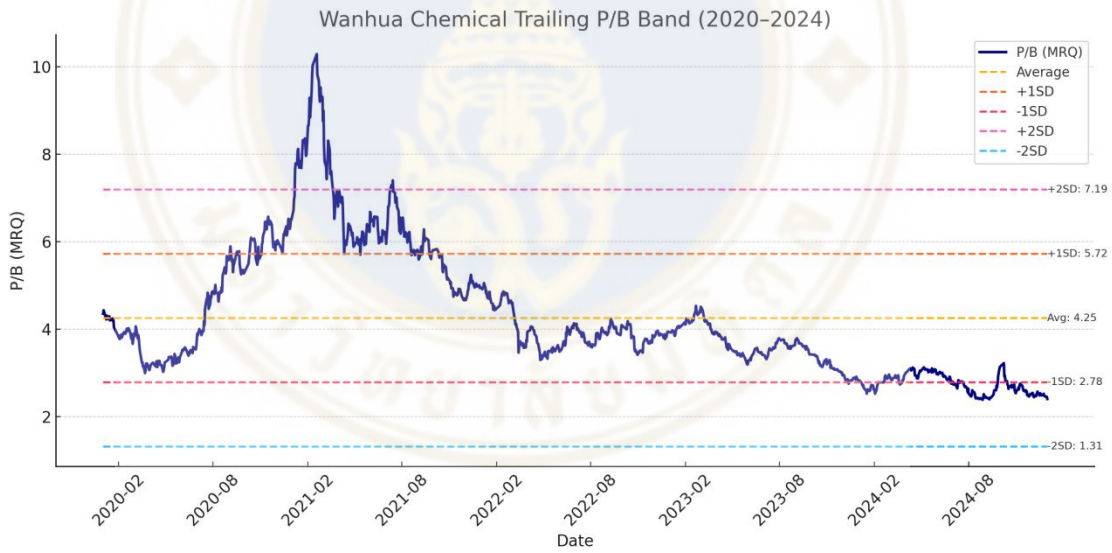

Figure 4.2 Wanhua Chemical Trailing P/B Band (2020–2024)

Source: iFind and PyCharm

4.1.3 Enterprise Value to EBITDA (EV/EBITDA)

By the end of 2024, Wanhua Chemical's Enterprise Value to EBITDA (EV/EBITDA) multiple was 9.91, slightly above the –1 standard deviation (SD) threshold of 8.14, yet still below the historical average of 12.86. This reflects a cautious market stance toward the company's operating cash flows. In early 2021, the

multiple surged beyond 25x, driven by optimistic growth assumptions. According to external forecasts, the EV/EBITDA for 2025 is projected to be 8.67 (iFind, 2024), positioning it in the lower-middle range of the 2020–2024 historical interval and slightly above the levels observed during 2023–2024. This indicates that the market anticipates a moderate recovery in the company's profitability, though the valuation has yet to return to pre-pandemic or peak cycle levels (Deloitte, 2024).

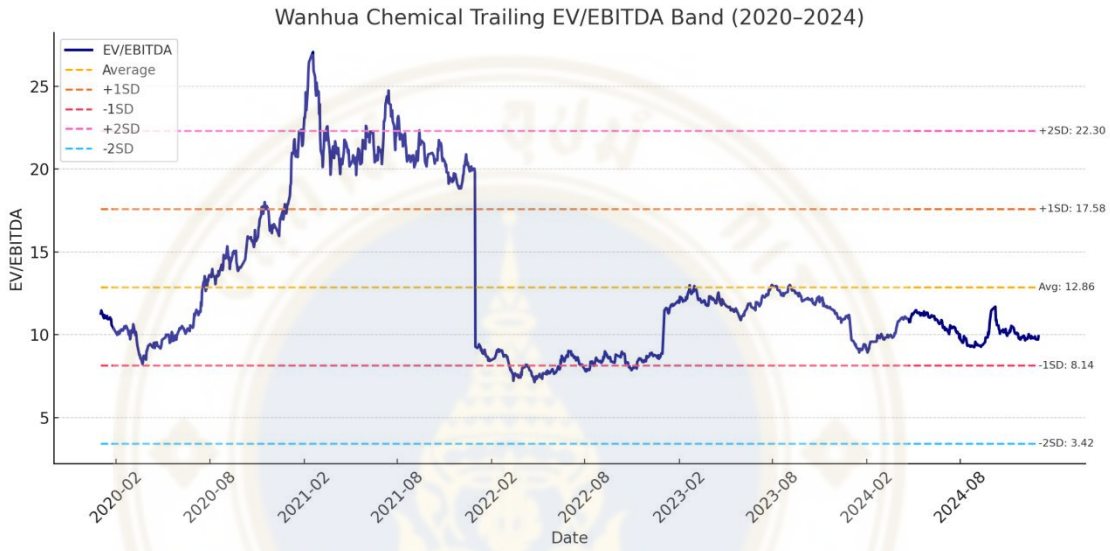

Figure 4.3 Wanhua Chemical Trailing EV/EBITDA Band (2020–2024)

Source: iFind and PyCharm

In In summary, Wanhua Chemical's current P/E, P/B, and EV/EBITDA ratios lie at the lower bound of its historical valuation bands, with several metrics falling below –1 standard deviation (SD), although none has yet breached the –2 standard deviation (SD) threshold. This may indicate that the market is adopting a conservative outlook or failing to fully reflect the company's intrinsic value.

However, historical multiples alone do not capture the company's future performance potential. To gain a more forward-looking perspective, the next section analyses Wanhua's valuation based on projected financial metrics for the period 2020–2024, applying forward multiples to assess whether a re-rating is justified in light of expected earnings and cash flow dynamics (Koller et al., 2020).

4.2 Forward Forecasted Multiples analysis (2020–2024)

This section analyses the company's forward-looking valuation multiples, including forward P/E, P/B, and EV/EBITDA, from 2020 to 2024. These metrics incorporate market consensus forecasts and reflect dynamic investor expectations for earnings, asset value, and cash flow.

4.2.1 Forward P/E

As shown in Figure 4.4, Wanhua's forward P/E ratio peaked above 32x in early 2021 and has since declined to approximately 14x by the end of 2024. This is below the historical average of 15.61x and close to the –1 standard deviation (SD) level of 10.30x (iFind, 2024). The declining trend reflects a shift toward more conservative investor expectations, despite Wanhua's stable profitability. If earnings per share improve in line with forecasts, this multiple may present a revaluation opportunity (Koller et al., 2020).

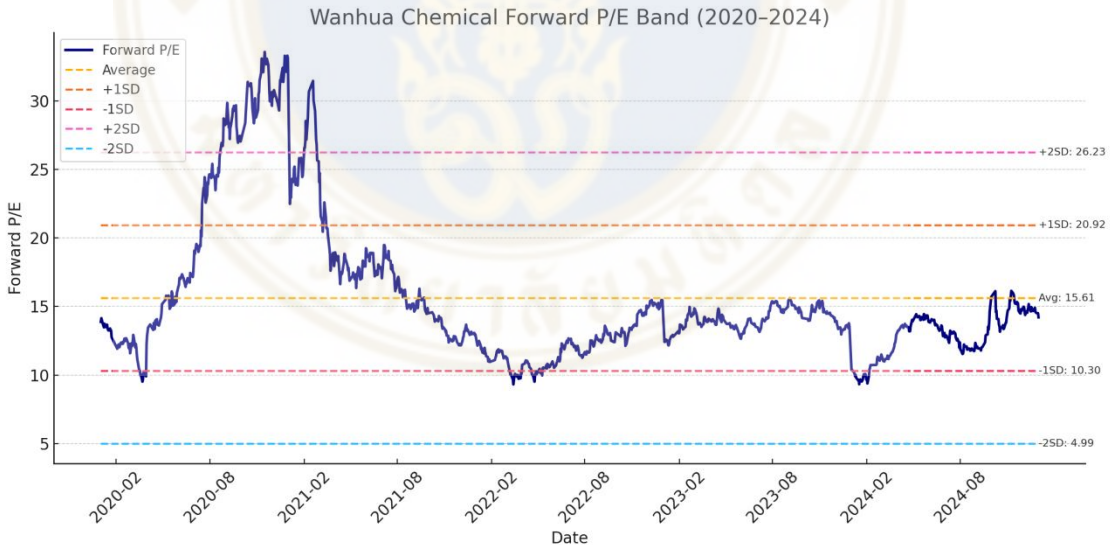

Figure 4.4 Wanhua Chemical Forward P/E Band (2020–2024E)

Source: iFind and PyCharm

4.2.2 Forward P/B

In Figure 4.5, Wanhua's forward P/B ratio dropped from over 6x in 2021 to approximately 2.2x in 2024, falling below the –1 standard deviation (SD) threshold of 2.66x but remaining above the –2 standard deviation (SD) level of 1.65x (iFind, 2024). This significant compression indicates that the stock price may have lagged the growth in book value. Given the company's strong ROE and capital efficiency, such a low valuation may not be fully justified and could represent an opportunity for multiple expansion (Penman, 2013).

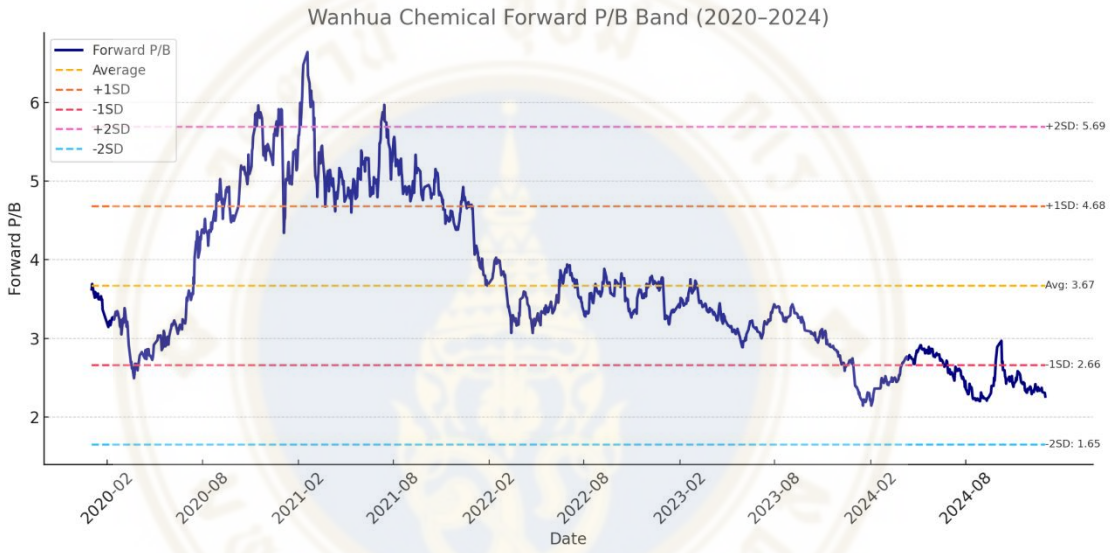

Figure 4.5 Wanhua Chemical Forward P/B Band (2020–2024E)

Source: iFind and PyCharm

4.2.3 Forward EV/EBITDA

As shown in Figure 4.6, Wanhua's forward EV/EBITDA ratio remained relatively stable, falling from a 2021 peak of nearly 19x to approximately 11x by the end of 2024. Although this level is slightly below the long-term average of 12.43x (iFind, 2024), it indicates that the market continues to value Wanhua's operating cash flows conservatively. Given consistent EBITDA generation, a recovery in sentiment could lead to upward multiple revision.

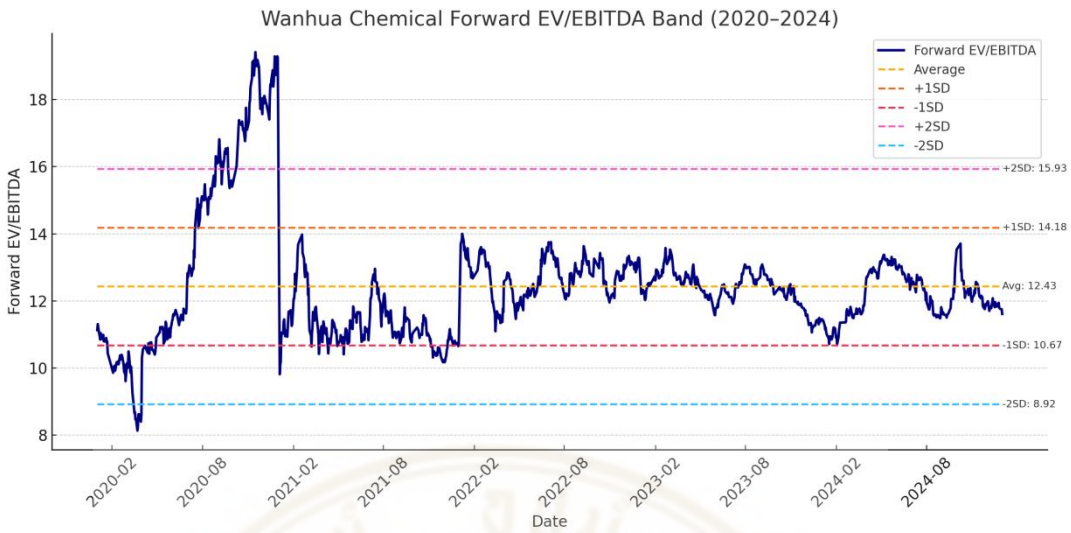

Figure 4.6 Wanhua Chemical Forward EV/EBITDA Band (2020–2024E)

Source: iFind and PyCharm

Overall, Wanhua Chemical's forward valuation multiples from 2020 to 2024 have declined toward the lower end of their historical ranges. With several ratios approaching or falling below the –1 standard deviation (SD) threshold, the market appears to be taking a cautious view. Nonetheless, if earnings and operational performance recover as expected, these suppressed multiples could present upside potential for revaluation (Koller et al., 2020).

4.3 Target Price Estimation Based on Internal Valuation Bands

Following the analysis of six core valuation bands (including trailing and forward P/E, P/B, and EV/EBITDA), Table 4.4 summarizes the implied target prices and upside/downside potentials for Wanhua Chemical based on its 2025 financial forecasts.

However, this valuation outcome should not be directly adopted as the investment recommendation. Multiple band valuation models are inherently backward-looking or company centric. They may reflect biased assumptions, outdated peaks, or internally optimistic trajectories. More importantly, such models lack external benchmarking and therefore fail to reflect the firm's relative market positioning (Damodaran, 2012; Pinto et al., 2020).

Thus, this section serves as an internal valuation reference, helping to identify anomalies or underpricing signals. To reach a more objective and market-aligned conclusion, the next section introduces a peer comparison approach, applying the valuation multiples of comparable companies to derive a cross-sectional target price range for Wanhua Chemical, which in turn supports a credible investment recommendation.

Table 4.1 Summary of Internal Band-Based Valuation (2025)

Multiple Band Valuation - 2025

WANHUA	Trailing PER	Trailing PBV	Trailing EV/EBITDA	Forward PER	Forward PBV	Forward EV/EBITDA	Average
Target Price	77.92	128.39	111.67	50.91	65.52	60.21	82.44
Upside/Downside (%)	41.54%	133.22%	102.84%	-7.52%	19.02%	9.37%	49.75%

Source: Bloomberg Terminal and calculation

4.4 Financial Overview of Peer Companies

Before conducting the comparable company valuation analysis, this study first summarizes the key financial metrics of the selected peer companies. The table covers valuation multiples (P/E, P/B, EV/EBITDA) reflecting market pricing levels, profitability indicators (ROE, Gross Profit Margin) measuring operational efficiency and cost control, and a leverage indicator D/E (Debt-to-Equity) Ratio assessing financial risk.

Overall, Wanhua Chemical demonstrates superior performance in terms of profitability and valuation metrics, while maintaining a reasonable leverage level, highlighting its strong competitive position.

Table 4.2 Financial Overview of Peer Companies in 2024

Company	Trailing P/E	Trailing P/B	Trailing EV/EBITDA	Forward P/E	Forward P/B	Forward EV/EBITDA	ROE (%)	D/E Ratio	Gross Profit Margin (%)
BASF SE	29.4	1.1	10.1	15.57	1.31	7.96	3.60%	1.18	25.67%
LyondellBasell	17.9	1.9	8.3	14.4	1.82	9.1	10.62%	1.87	11.30%
Resonac	19	1.2	25.6	13.8	0.81	7.6	10.99%	2.14	22.40%
Dow Inc.	25.6	1.51	8.26	20.95	1.54	7.54	6.23%	2.21	10.90%
Mitsui Chemicals	15.8	0.9	8	14.6	1.88	7.4	5.24%	1.25	21.20%
Wanhua Chemical	17.2	2.4	9.9	14.27	2.17	10.39	14.21%	1.83	15.98%

Source: Bloomberg Terminal and calculation

4.5 Comparable Company valuation method

The Comparable Company Valuation Method is a widely used relative valuation technique that estimates a target company's fair value by benchmarking it against selected industry peers using key financial multiples such as Price-to-Earnings (P/E), Price-to-Book (P/B), and Enterprise Value to EBITDA (EV/EBITDA). To ensure meaningful comparability and robust analysis, this study selects five globally significant chemical companies as reference benchmarks: BASF SE (Germany), Dow Inc. (United States), LyondellBasell Industries N.V. (Netherlands), Resonac Holdings Corporation (Japan), and Mitsui Chemicals Inc. (Japan). These firms share considerable similarities with Wanhua Chemical in terms of core business segments, technological capabilities, international market presence, and operational scale, making them suitable comparable for this analysis (Chen, 2022; Macabacus, n.d).

By applying the peer companies' valuation multiples to Wanhua Chemical's forecasted financial data for 2025, this section aims to derive a systematic estimation of its target stock price across multiple approaches—trailing multiples, forward-looking multiples, and quantile-based sensitivity analysis—thereby providing investors with a comprehensive and forward-looking valuation perspective.

4.5.1 Valuation Based on Trailing Multiples

Trailing valuation is derived from the actual financial performance over the past year and is often used to benchmark current market pricing against realized profitability. According to the data on December 30, 2024, the average trailing P/E, P/BV, and EV/EBITDA among the peer group are 20.82, 1.50, and 11.69, respectively (Bloomberg Terminal, 2024).

Using Wanhua's 2025 projected financial metrics (EPS = 4.3, Book Value per Share = 33.09, EBITDA = RMB 32,118.6 million, Net debt = RMB 89,421.5 million, and 3139.75 million Shares outstanding), the implied target prices are calculated to be RMB 89.53 under the P/E multiple, RMB 49.64 under the P/BV multiple, and RMB 91.10 under the EV/EBITDA multiple.

Table 4.3 Peer Multiples (Last 12 months)

Peer Multiples (Trailing)								Million
Ticker	Company Name	Country	Market Capital (MIllion)	Currency	Closing Price	Trailing PER	Trailing PBV	Trailing EV/EBITDA
					30-Dec-24	30-Dec-24	30-Dec-24	30-Dec-24
BAS	BASF SE	Germany	12,653.20	EUR	EUR 42.5	29.4	1.1	10.1
LYB.N	LyondellBasell Industries N.V.	Netherlands	24,094	USD	USD 74.3	17.9	1.9	8.3
4004.T	Resonac	Japan	725,461.40	JPY	JPY 4,015	19	1.2	25.6
DOW	Dow Inc.	United States	28,191	USD	USD 39.4	25.6	1.51	8.26
4183.T	Mitsui Chemicals	Japan	789,453.30	JPY	JPY 4,152	15.8	0.9	8
600309.SH	Wanhua Chemical	China	30,098.60	CNY	CNY 71.4	17.2	2.4	9.9
					Peer Average	20.82	1.50	11.69
					Peer Medin	18.45	1.36	9.10
					Min	15.80	0.90	8.00
					Max	29.4	2.4	25.6

Source: Bloomberg Terminal and calculation

The trailing-based valuation reflects how Wanhua would be priced if investors used past performance benchmarks, particularly under a recovery or momentum context. All three valuation methods show that the 2025 estimated share price of RMB 55.05 is below the trailing-derived estimates, suggesting potential undervaluation based on realized fundamentals (CFA Institute, 2025).

4.5.2 Valuation Based on Forward Multiples

Forward multiples reflect how the market values comparable companies based on anticipated earnings and balance sheet forecasts. These multiples are commonly referenced in analyst reports and are considered more dynamic. As of December 30, 2024, the average forward P/E, P/B, and EV/EBITDA for the selected peer group were 15.60, 1.59, and 8.33, respectively (Bloomberg Terminal, 2024). The implied target prices are calculated to be RMB 67.08 under the P/E multiple, RMB 52.61 under the P/BV multiple, and RMB 56.73 under the EV/EBITDA multiple.

Table 4.4 Peer Multiples (Forward)

Peer Multiples (Forward)							Million	
Ticker	Company Name	Country	Market Capital (MIllion)	Currency	Closing Price	Forward PER	Forward PBV	Forward EV/EBITDA
					30-Dec-24	30-Dec-24	30-Dec-24	30-Dec-24
BAS	BASF SE	Germany	12,653.20	EUR	EUR 42.5	15.57	1.31	7.96
LYB.N	LyondellBasell Industries N.V.	Netherlands	24,094	USD	USD 74.3	14.4	1.82	9.1
4004.T	Resonac	Japan	725,461.40	JPY	JPY 4,015	13.8	0.81	7.6
DOW	Dow Inc.	United States	28,191	USD	USD 39.4	20.95	1.54	7.54
4183.T	Mitsui Chemicals	Japan	789,453.30	JPY	JPY 4,152	14.6	1.88	7.4
600309.SH	Wanhua Chemical	China	30,098.60	CNY	9.8	14.27	2.17	10.39
					Peer Average	15.60	1.59	8.33
					Peer Medin	14.50	1.68	7.78
					Min	13.8	0.81	7.4
					Max	20.95	2.17	10.39

Source: Bloomberg Terminal and calculation

Compared to the trailing approach, forward multiples offer more real-time alignment with market expectations and provide a more conservative valuation base. Notably, both the forward P/E-based price (RMB 67.08) and the EV/EBITDA-based price (RMB 56.73) exceed the 2025 estimated share price of RMB 55.05, indicating moderate undervaluation even under cautious growth assumptions.

By separating forward-looking and historical peer valuation approaches, this section reveals consistent signals of undervaluation across both methodologies. While trailing multiples suggest greater upside potential under a re-rating or cyclical rebound (e.g., up to RMB 91.10), forward-based estimates point to a more measured yet still supportive valuation range, between RMB 52.61 and RMB 67.08 (Investopedia, n.d.).

4.5.3 Valuation Based on Quantile Multiples

To further account for valuation sensitivity under different market expectations, this study incorporates a quantile-based valuation approach. This method evaluates Wanhua Chemical's implied stock prices using the minimum, median, and maximum multiples observed among peers (Bloomberg Terminal, 2024), across three valuation metrics: P/E, P/BV, and EV/EBITDA.

Table 4.5 Wanhua 2025 Financial Forecast

Wanhua	2025 (E)
Total shares (Million)	3139.75
Book Value/Share	33.09
EBITDA (Million)	32,118.60
Total Debt (Million)	89,421.50
EPS	4.3
Stock price	55.05

Source: Bloomberg Terminal

Table 4.6 Peer Multiples

Companies	P/E	P/B	EV/EBITDA
BASF SE	29.4	1.1	10.1
LyondellBasell Industries N.V.	17.9	1.9	8.3
Resonac	19.0	1.2	25.6
Dow	25.6	1.51	8.26
Wanhua	17.2	2.4	9.9
Mitsui Chemicals	15.8	0.9	8.0
Median	18.45	1.36	9.1
Min	15.8	0.9	8.0
Max	29.4	2.4	25.6

Source: Bloomberg Terminal and calculation

The valuation analysis utilizing percentile multiples yields the following target price ranges for Wanhua's 2025 projections across three scenarios: Conservative (Min): ¥29.78 – 67.94; Base (Median): ¥45.00 – 79.34 ; Optimistic (Max): ¥79.42 – 233.40 .

Table 4.7 Peer-Based Target Price Estimation

Scenario	P/E Price (RMB)	P/BV Price (RMB)	EV/EBITDA Price (RMB)
Min	67.94	29.78	53.36
Median	79.34	45.00	64.61
Max	126.42	79.42	233.4

Source: Bloomberg Terminal and calculation

This model offers a structured view of valuation ranges across market moods. In bearish scenarios, the lower bound helps define downside risk; while in bullish or re-rating environments, the upper bound illustrates the extent of potential upside. Even under the baseline (median) case, the estimated values for P/E and EV/EBITDA remain above the current forecast stock price of RMB 55.05, suggesting moderate undervaluation.

4.6 Final Valuation Method Selection and Target Price Setting

Among the three peer comparison-based valuation methods applied in this chapter—namely trailing multiples, forward multiples, and quantile multiples—this study ultimately adopts the median-based quantile valuation as the primary foundation for determining Wanhua Chemical's target price. This method filters out statistical outliers and better reflects prevailing industry norms, particularly in cyclical sectors where valuation dispersion can be significant. As a large-cap chemical manufacturer with strong earnings resilience across economic cycles, Wanhua Chemical is well suited to be assessed using a median-based approach, which enhances valuation stability and reliability (Pinto et al., 2020).

Based on the median multiples of comparable companies, the 2025 target prices for Wanhua Chemical are: ¥79.34 via P/E, ¥45.00 via P/B, and ¥64.61 via EV/EBITDA. These figures collectively form a robust and representative valuation range of [RMB 45.00 to RMB 79.34].

Given that the chemical industry is currently not in an extreme phase of its earnings cycle and that market pricing includes a certain level of discounting for future profits, this study uses the arithmetic average of the three estimates to provide a

balanced valuation anchor. The resulting average is RMB 62.98, which is then rounded to RMB 63 for clarity and strategic communication. This figure serves as the final indicative target price under this valuation framework.

Based on the 2025 estimated share price of RMB 55.05, the target price of RMB 63 implies an upside potential of approximately 14.4%, thereby providing a clear quantitative basis for the investment recommendation outlined in Chapter V.

CHAPTER V
INVESTMENT RECOMMENDATION

This chapter presents a comprehensive investment recommendation for Wanhua Chemical based on multi-method valuation outcomes and risk assessments. It first establishes a recommendation threshold framework (5.1), followed by providing a comprehensive investment assessment and recommendation (5.2), identifying major risk factors (5.3), visualizing risk levels through a matrix (5.4), and concluding with a summary of the core investment perspective (5.5).

5.1 Recommendation Threshold Framework

To ensure the objectivity, consistency, and practical operability of investment recommendations, this study establishes a formal threshold framework based on the relative upside or downside potential between the target price and Wanhua Chemical's current market price. The thresholds are set with reference to typical industry standards, considering the moderate volatility of the chemical sector and Wanhua Chemical's relatively stable market performance with valuation fluctuations near the industry median.

Accordingly, appropriate adjustments were made: The Hold range was widened to ±10% to better capture normal fluctuations, while the Buy and Strongly Buy thresholds were set at +10.01% to +19.99% and above +20%, respectively, reflecting reasonable revaluation expectations. This framework classifies investment recommendations into Strongly Sell, Sell, Hold, Buy, and Strongly Buy based on the percentage difference, providing a clear and standardized decision-making basis, ensuring that the final recommendation is quantitatively grounded and logically aligned with valuation results (Schwab, 2024).

Based on this framework, Wanhua's target price of RMB 63 compared to the 2025 (E) stock price of RMB 55.05 reflects an upside of approximately 14.4%, falling into the Buy recommendation range.

Table 5.1 Recommendation Threshold for Investment Decision

Recommendation	When the Target Price is
Strongly Sell	Lower than or equal to -20% of the current price
Sell	Between -19.99% and -10.01% of the current price
Hold	Between -10% and +10% of the current price
Buy	Between +10.01% and +19.99% of the current price
Strongly Buy	Greater than or equal to +20% of the current price

Source: Compiled based on the investment rating framework of Goldman Sachs

5.2 Comprehensive Assessment and Investment Recommendation

Based on the valuation results presented in Chapter IV, this study cross-validates the outcomes using the median peer multiples of P/E, P/B, and EV/EBITDA. The final fair value for Wanhua Chemical is set at RMB 63, which lies slightly above the midpoint of the robust valuation range.

Taking into account the company's strong fundamentals and prevailing market sentiment, this study recommends a buy-in range of RMB 50 to RMB 63. The lower bound (RMB 50) corresponds to the bottom of the valuation band and represents an attractive entry point with a favourable risk-reward ratio. The upper bound (RMB 63) reflects the derived fair value anchor under a steady-state industry scenario (BCG., 2023).

Using the forecasted market price of RMB 55.05 for 2025 as a reference, investors who gradually accumulate positions within the recommended range and aim for the 12-month target price of RMB 63 may achieve a potential upside of approximately 14.4%. This setup provides a balance between valuation recovery potential and risk control, making it appropriate for long-term investors with moderate risk tolerance seeking stable returns.

In conclusion, considering Wanhua Chemical's solid fundamentals—including its global leadership in MDI production, sustained ROE above 14%, and substantial R&D investment —along with the current market price being below its

intrinsic value, the stock presents a clear allocation opportunity currently (Yankovitz, 2024). It is therefore recommended that investors accumulate shares between RMB 50 and 63 and adopt a dynamic position-sizing strategy. Priority should be given to staged buying during market consolidations or weakness, allowing for value realization as industry sentiment recovers and fundamentals are reflected in the market.

5.3 Risk Warnings

While Wanhua Chemical presents significant upside potential, investors should remain vigilant regarding several key risks. In the short term, fluctuations in crude oil and natural gas prices may compress profit margins (International Energy Agency, 2022); however, the company mitigates this exposure through its vertically integrated petrochemical operations. Over the medium term, regulatory changes—such as the European Union's Carbon Border Adjustment Mechanism (CBAM)—may adversely affect the company's overseas revenues (European Commission, 2023). Nevertheless, Wanhua's localized production facilities in Hungary and the United States are expected to buffer some of these impacts (McKinsey & Company, 2023). In the long run, the inherent cyclicality of the chemical industry, along with the extended return cycles of large-scale capital expenditures, could result in delays in realizing expected profitability (Deloitte, 2024).

Lastly, global macroeconomic and geopolitical uncertainties—such as U.S.–China relations and interest rate fluctuations (World Bank, 2023)—should also be closely monitored, as they may indirectly influence market valuation through investor sentiment. Therefore, while recognizing Wanhua's long-term value, investors are advised to dynamically assess and adapt to evolving risk conditions.

5.4 Risk Evaluation Matrix

To visualize these risks, a matrix is constructed based on their likelihood and impact. Red denotes high risk, yellow indicates medium risk, and green represents low risk, thereby assisting investors in prioritizing risk management strategies accordingly (Yankovitz et al., 2024).

Table 5.2 Risk Evaluation Matrix for Wanhua Chemical

Risk Factor	Likelihood	Impact	Overall Risk
Raw Material Price Volatility	High	Medium	High
Foreign Policy & Trade Barriers	Medium	Medium	Medium
Industry Cyclicality	Medium	High	High
CapEx Execution Risk	Medium	Medium	Medium
Macroeconomic & Geopolitical	Low	High	Medium

Source: Based on standard risk assessment practices

As shown in Table 5.1, the most significant risks for Wanhua Chemical include raw material price volatility and industry cyclicality, both rated as "High" overall. These risks are closely tied to global commodity markets and downstream demand conditions and therefore require active monitoring and mitigation.

5.5 Summary and Recommendation

In summary, Wanhua Chemical's estimated share price of 2025 falls below the fair value range derived from multiple peer-based valuation methods. With its leading position in the global MDI industry, strong ROE performance, and strategic innovation spending, the company offers a compelling long-term value proposition (Morgan Stanley, 2025). The present valuation does not fully reflect these strengths, indicating potential undervaluation.

While acknowledging external uncertainties such as macroeconomic shifts and policy risks, this study recommends accumulating shares within the **RMB 50–63 range,** with a **12-month price target of RMB 63**, representing an expected **14.4% upside.** Overall, a **BUY** recommendation is assigned, supporting long-term value investors seeking resilient growth exposure (Charles Schwab, n.d.).

REFERENCES

BASF. (2025). *BASF Global*. https://www.basf.com/global/en

BCG. (2023). *Global chemicals industry outlook: Navigating the new reality*. Boston Consulting Group. https://www.bcg.com

Bloomberg Terminal. (2024). *Peer group valuation metrics* [Data set].

CFA Institute. (2025). *Market-based valuation: Price and enterprise value multiples*. https://www.cfainstitute.org/insights/professional-learning/refresher-readings/2025/market-based-valuation-price-enterprise-value-multiples

Charles Schwab. (n.d.). *Buy, hold, sell: What analyst stock ratings mean.* Charles Schwab & Co. Retrieved May 21, 2025, https://www.schwab.com/learn/story/buy-hold-sell-what-analyst-stock-ratings-mean

Chemical & Engineering News. (2024, June 3). C&EN's global top 50 chemical firms for 2024. *Chemical & Engineering News*. https://cen.acs.org/business/finance/CENs-Global-Top-50-2024/102/i22

Chen, J. (2022, August 31). Comparable company analysis (CCA): How is it used in investing? *Investopedia*. https://www.investopedia.com/terms/c/comparable-company- analysis-cca.asp

Damodaran, A. (2012). *Investment valuation: Tools and techniques for determining the value of any asset* (3rd ed.). Wiley.

Deloitte. (2024). *2023 chemical industry outlook.* https://www.deloitte.com/global/en/Industries/power-utilities-renewables/analysis/chem-outlook.html

Denny, J. (2024, July 31). Biobased, recycled and renewable carbon chemicals: An introduction. *ResourceWise*. https://www.resourcewise.com/chemicals-blog/biobased-recycled-and-renewable-carbon-chemicals-an-introduction

Dow. (2024). *2024 annual report*. https://s23.q4cdn.com/981382065/files/doc_financials/2024/ar/Dow_2024_Annual_Report_Web.pdf

Eastmoney Caifuhao. (2024, September 18). *Wanhua Chemical (600309): The core remains capacity expansion.* Eastmoney. https://caifuhao.eastmoney.com/news/20240918145445643329030

REFERENCES (Cont.)

Eastmoney Securities. (2024). *Financial analysis of Wanhua Chemical (SH600309)*. https://emweb.securities.eastmoney.com/pc_hsf10/pages/index.html?type=web&code=SH600309

Echemi. (2024, April 15). Wanhua Chemical reports 182-billion-yuan revenue in 2024 despite Q1 2025 dip. *Echemi*. https://www.echemi.com/cms/2353194.html

European Commission. (2023). *Carbon Border Adjustment Mechanism (CBAM)*. https://taxation-customs.ec.europa.eu/carbon-border-adjustment-mechanism_en

FinChat. (2024). *Wanhua Chemical (600309.SS) financial data* [Data set]. https://finchat.io

International Energy Agency. (2022). *The impact of energy prices on chemical production costs*. https://www.iea.org

International Monetary Fund. (2023). *World economic outlook: Navigating global divergences*. https://www.imf.org

Investopedia. (n.d.). *Relative valuation model: Definition, steps, and types of models*. Retrieved May 5, 2025, from https://www.investopedia.com/terms/r/relative-valuation-model.asp

Koller, T., Goedhart, M., & Wessels, D. (2020). *Valuation: Measuring and managing the value of companies* (7th ed.). Wiley.

LyondellBasell Industries. (2024). *Company overview and investor data*. https://www.lyondellbasell.com

Macabacus. (n.d.). *Valuation multiples: Enterprise vs equity, P/E, EBITDA, EBIT, sales*. Retrieved May 5, 2025, from https://macabacus.com/valuation/multiples

MarketsandMarkets. (2025). *Global chemical industry outlook 2025*. https://www.marketsandmarkets.com/Market-Reports/global-chemical-industry-outlook-89294716.html

REFERENCES (Cont.)

McKinsey & Company. (2023). *Sustainable feedstocks: Accelerating recarbonization in chemicals.* https://www.mckinsey.com/industries/chemicals/our-insights/sustainable-feedstocks-accelerating-recarbonization-in-chemicals

McKinsey & Company. (2024, June 4). *Positioning for success in the chemical markets of the future.* https://www.mckinsey.com/industries/chemicals/our-insights/ positioning-for-success-in-the-chemical-markets-of-the-future

Mitsui Chemicals Inc. (2024). *Company profile and global business overview.* https://www.mitsuichem.com

Morgan Stanley. (2025, January). Morgan Stanley cuts Wanhua Chemical target to RMB74 from RMB100. *Investing.com.* https://www.investing.com/news/analyst-ratings/morgan-stanley-cuts-wanhua-chemical-target-to-rmb74-from-rmb100-93CH-3738731

Penman, S. H. (2013). *Financial statement analysis and security valuation* (5th ed.). McGraw-Hill Education.

Pinto, J. E., Henry, E., Robinson, T. R., & Stowe, J. D. (2020). *Equity asset valuation* (4th ed., pp. 205–206, 234–235). Wiley.

Resonac Holdings Corporation. (2024). Corporate profile and business areas. https://www.resonac.com

Sohu. (2025). *Top 10 circulating shareholders–Wanhua Chemical (600309).* https://q.stock. sohu.com/cn/600309/ltgd.shtml

Wanhua Chemical Group. (2024a). *Annual report 2023.* https://pdf.dfcfw.com/pdf/H2_AN202403181626984132_1.pdf

Wanhua Chemical Group. (2024b). *Major operating data for the first three quarters of 2024.* https://www.whchem.com

Wanhua Chemical Group. (2024c). *2023 Wanhua Chemical Group ESG report.* https://video.ceultimate.com/100009_2012105017/2023_Wanhua_Chemical_ESG_Report.pdf

REFERENCES (Cont.)

Wanhua Chemical Group. (n.d.-a). *Company profile.* https://www.whchem.com/en/about/profile

Wanhua Chemical Group. (n.d.-b). *Wanhua strategy.* https://www.whchem.com/en/about/mission

World Bank. (2023). *Global economic prospects: Navigating geopolitical tensions.* https://www.worldbank.org

Yankovitz, D., Hardin, K., Kumpf, R., & Christian, A. (2024). *2024 chemical industry outlook.* Deloitte Insights. https://www2.deloitte.com/us/en/insights/industry/oil-and-gas/chemical-industry-outlook.html