

# Supply and Demand of the Fundamental Analysis Framework for Float Glass

Huanwan Li

Shenzhen KaiFeng Investment Management Co., Ltd, Shenzhen 518000, China

**Abstract:** This template explains and demonstrates how to prepare your camera-ready paper for Trans Tech Publications. The best is to read these instructions and follow the outline of this text. Please make the page settings of your word processor to A4 format (21 x 29,7 cm or 8 x 11 inches); with the margins: bottom 1.5 cm (0.59 in) and top 3 cm (1.18 in), right/left margins must be 2 cm (0.78 in). This template explains and demonstrates how to prepare your camera-ready paper for Trans Tech Publications. The best is to read these instructions and follow the outline of this text. Please make the page settings of your word processor to A4 format (21 x 29,7 cm or 8 x 11 inches); with the margins: bottom 1.5 cm (0.59 in) and top 3 cm (1.18 in), right/left margins must be 2 cm (0.78 in).

**Keywords:** Supply, Demand, Supply & Demand Balance Sheet, Float glass.

## 1. Introduction

The fundamental analysis framework of industry is mainly composed of four elements, supply, demand, inventory and import-export. These elements also form the Supply & Demand Balance Sheet. We can use the Supply & Demand Balance Sheet to review history, adjust current and forecast future of the industry's supply and demand balance. Depending on changes of the Supply & Demand balance sheet, we can also forecast future price trends and evaluate future price. The most important two elements among the four are supply and demand, as the interaction of supply and demand determines price, and price also results in supply and demand. This paper will conduct a fundamental analysis framework of float glass around supply and demand.

## 2. Supply

### 2.1. Supply in Broad Sense

Supply in broad sense refers to an understanding of global

supply landscape. We need to know the amount of global capacity and production, the proportion of domestic supply in the world, the degree of import-export trade dependence, and the main supplying countries. For example, the proportion of China's flat glass output in the world accounted for 53% and 56% in 2007 and 2017. From the perspective of import dependency and self-sufficiency, flat glass got low degree of import dependency and high degree of self-sufficiency. Judging from the trend aspect, the import dependency of flat glass had shown a trend of increasing first and then decreasing from 2017. After reaching the peak in 2021, it fell to the lowest level in 2022. However, in absolute terms, the degree of flat glass's dependency has always been low. Therefore, flat glass is less affected by imports. Depending on supply in broad sense of flat glass, it's mainly affected by domestic market. Accordingly, the fundamental analysis of float glass will be more focused on the domestic part.

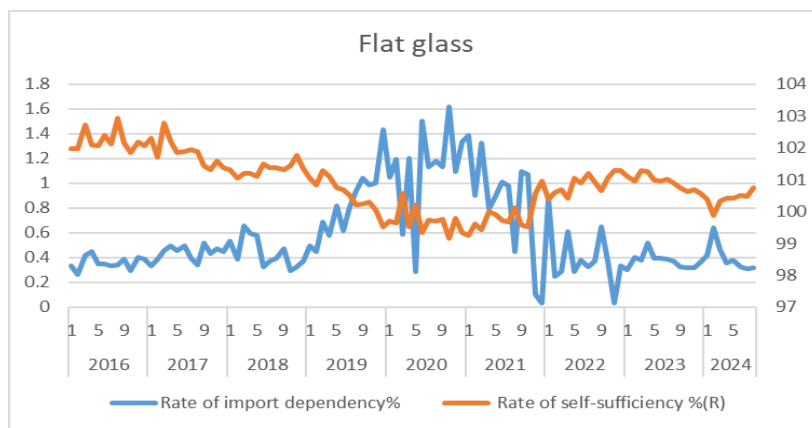


Figure 1. The rate of import dependency and self-sufficiency of flat glass [1]

### 2.2. Domestic Supply

#### 2.2.1. Supply fundamentals

First, we need to understand a few elements: total production capacity, effective production capacity, production shutdown and eliminate production (including

reasons of elimination), and future production plans. These can help us understand the macro supply situation of a product quickly. From the micro perspective, we need to know more details about supply: What are the characteristics of production capacity distribution? What causes such characteristics? Is it because of the cost advantage on the

resource side or is it based on demand? These questions need to be found out. In addition, different regions will encounter different policies which may affect supply. For example, float glass in Shahe area of Hebei Province is easily affected by environmental protection and has to decrease or stop production. Therefore, supply analysis must also pay more attention to policy changes in the main producing areas.

### 2.2.2. Impact of production process on supply

Production process also has a certain impact on supply. Different production processes have different requirements in terms of energy consumption, emissions and environmental protection. In addition, there are specific differences in the production costs and final product quality of different production processes. The main difference in the production process of float glass is the fuel. When the price of a certain type of fuel fluctuates sharply, the cost support of float glass which is using this certain type of fuel will also follow the changes. Especially when the product price is close to its cost, a sharp rise in fuel may lead to a reduction in production which are often anticipated and traded by the capital market. In addition, environmental controls on the emissions of a

particular fuel will also have an impact on supply.

### 2.2.3. Supply forecast

First, based on historical data, we can summarize seasonal patterns of output, as well as the willingness of manufacturing company to lift the load under changes of profits. Secondly, we are able to make advanced predictions of future output, and adjust predictions consistently according to current dynamic changes in prices and profits and the manufacturer's updated maintenance and repair plan.

According to seasonal patterns, float glass generally shows more cold repairs (reduced production) in 4th quarters, and more resumptions and new production capacities (increased production) in 2nd and 3rd quarters. However, float glass has its own particularity as glass kilns generally produce continuously for more than 8-10 years, and the cost of stopping production is very high. Therefore, it's more likely to arrange a maintenance plan based on the life of the glass kiln rather than profits, unless special circumstances occur, like sustained losses for a long time or the inventory is extremely high.

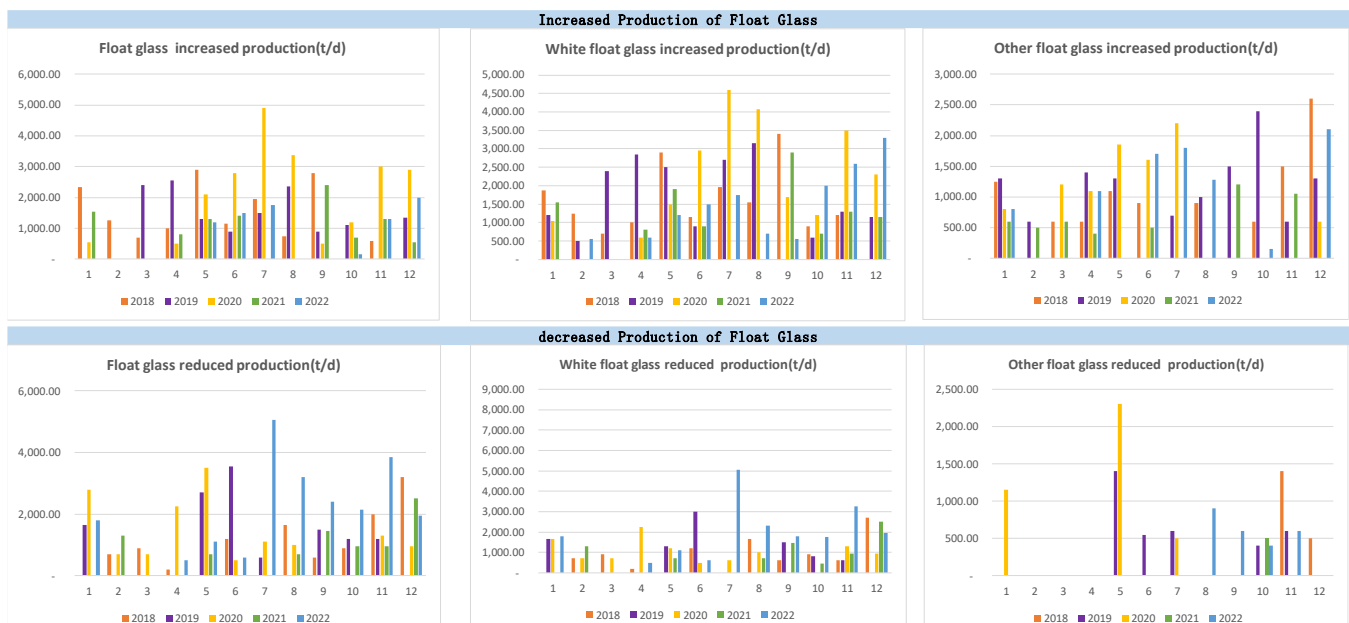


Figure 2. Increased and decreased production of float glass [2]

According to the characteristics above, we need several steps to forecasting output of float glass. First, evaluate kiln life based on different fuels. Second, calculate expected maintenance date based on commissioning date and kiln life or assess construction time for resumption of glass kilns and calculated expected resumption date. Third, choose kilns that are of appropriate age for maintenance or resumption and confirm with the float glass manufacturers whether there are maintenance or resumption plans in this year. Fourth, continue to track the plans and adjust the forecast.

### 2.2.4. Supply substitution

The substitution of supply generally depends on the profit difference between two substitutable products. When the substitution comes, supply will also be affected. In 2020 to 2021, there was an obvious substitution between float glass

and photovoltaic rolled glass as the profit gap expands rapidly. In April 2020, the profit of gas-fired photovoltaic rolled glass began to be higher than that of float glass. When it came to August, the profit of photovoltaic rolled glass was significantly ahead of that of float glass. At that time, a large number of float glass production lines changed to supply photovoltaic module backplane orders. However, after the Spring Festival in 2021, with the rapid new production capacities of photovoltaic rolled glass lines put into production, profit of photovoltaic rolled glass were rapidly descending. Under such circumstances, those float glass lines that supply photovoltaic module backplanes were quickly changed back to supply the original traditional construction orders. Therefore, to analyzing the supply, we should also pay attention to the impact of supply substitution when the relative profit changes.

Float glass lines which changed to supply photovoltaic module backplane orders				
October 2020				
No	Region	Enterprise	Production line	Daily production (t/d)
1	North China	CHINA YAOHUA GLASS GROUP CO.,LTD.	Modification Line	560
2		SUQIAN CHINA ELECTRONIC GLASS CO.,LTD.	LINE 1	400
3		JINJING GROUP CO.,LTD.	LINE 1	600
4		TAIWAN GLASS CO.,LTD.	LINE 1	450
5	East China	ZHEJIANG KIBING GLASS CO.,LTD.	LINE 1	900
6		ANHUI DONGRUN GLASS CO.,LTD.	LINE 1	350
7		WEIHAI CHINA NEW MATERIAL TECHNOLOGY GLASS CO.,LTD.	LINE 3	450
8		HUAGUANG PHOTOELECTRICITY CO.,LTD.	LINE 1	250
9		CHENZHOU KIBING GLASS CO.,LTD.	LINE 1	350
10		HENAN PROVINCE ZHONGLIAN GLASS CO.,LTD.	Relocation line	600
11	Central China	WUHAN CHANGLI GLASS CO.,LTD.	LINE 1	900
12		CHINA NATIONAL BUILDING MATERIAL(PUYANG) GROUP CO.,LTD.	LINE 1	400
13		XINYI GLASS (GUANGXI) CO.,LTD.	LINE 3	500
14		XINYI GLASS (GUANGXI) CO.,LTD.	LINE 4	500
15	South China	XINYI GLASS (DONGGUAN) CO.,LTD.	LINE 1	600
16		ZHANGZHOU KIBING GLASS CO.,LTD.	LINE 2	600
17		ZHANGZHOU KIBING GLASS CO.,LTD.	LINE 7	500
18		FUJIAN XINFUXING GLASS CO.,LTD.	LINE 1	400
19	Southwest	CHENGDU SOUTH GLASS CO.,LTD.	LINE 1	450
20	Northeast	AGC GLASS (DALIAN) CO.,LTD.	LINE 1	600
Total				10360

Float glass lines which changed to supply photovoltaic module backplane orders				
April 2021				
No	Region	Enterprise	Production line	Daily production (t/d)
1	Central China	WUHAN CHANGLI GLASS CO.,LTD.	LINE 1	900
2	East China	ZHEJIANG KIBING GLASS CO.,LTD.	LINE 1	900
3	Central China	CHENZHOU KIBING GLASS CO.,LTD.	LINE 1	350
4	Central China	CHENZHOU KIBING GLASS CO.,LTD.	LINE 2	650
5	South China	ZHANGZHOU KIBING GLASS CO.,LTD.	LINE 7	500
Total				3300

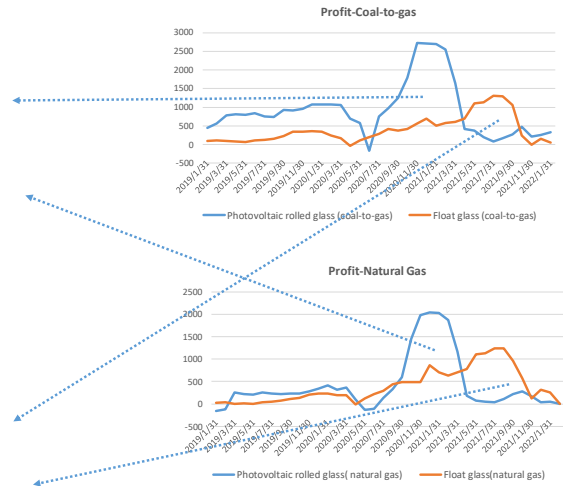


Figure 3. Supply substitution of float glass [3]

### 3. Demand

Generally, we have three types of demands: the first one is rigid demand; the second one is speculative demand; the third one is substituting demand. This paper mainly focus on the rigid demand and speculative demand as substitute demand of float glass does not often occur.

#### 3.1. Rigid Demand

What is rigid demand? Take float glass industry as an example. The glass processing factories purchase float glass and process it (coating, toughening, laminating, etc.), and then supply the processed glass to the glass windows & doors companies or curtain wall companies the glass windows & doors companies or curtain wall companies bring all materials to the construction site for installation. When the construction site is handed over to the property owner, all the glass windows, doors and curtain walls won't be transferred to the next production or service process, then we call it rigid demand. The growth of rigid demand depends on seasonality, downstream profits and develop trends of terminal application industries.

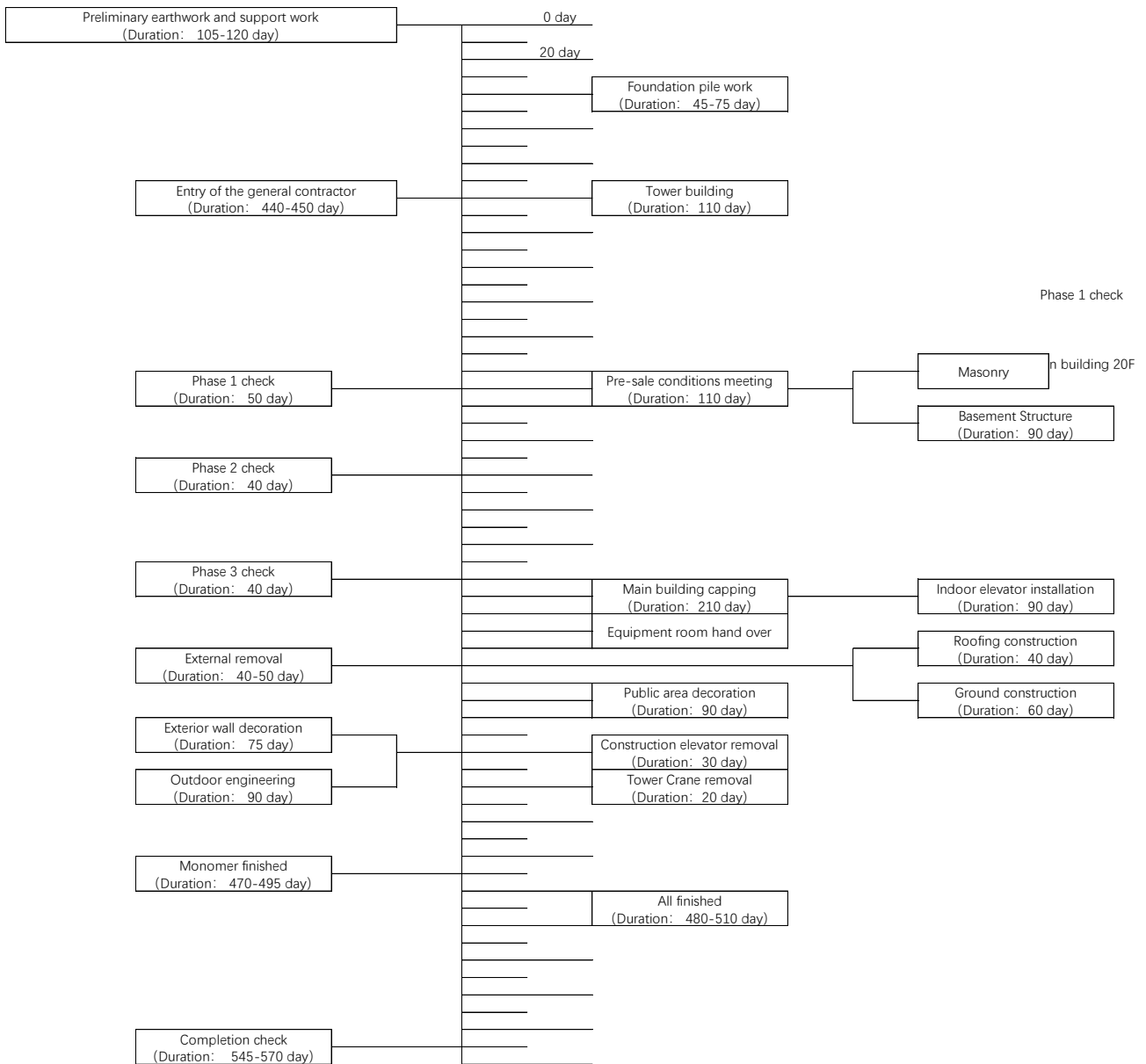
##### 3.1.1. Lead indicators of rigid demand

The downstream industries of float glass are mainly real estate, automobiles, electronic appliances, etc. More than 75% of its demand is directly related to real estate, and the second largest demand area is the automotive industry. Therefore, the floor space of building completed, and automobile production are highly related to the consumption of float glass. However, there is a data lag, and these data can only be used for verification. Therefore we need to find proper leading indicators.

#### (1) Long-term lead indicators

Take the glass demand in real estate as an example. First, in terms of the main process, there is a rough timeline. The preliminary earthwork, support and foundation pile work basically takes about 4 months; then, from the entry of the general contractor to the capping, it takes about a year and a half; finally, from capping to completion, it takes about ten months to a year. Different cities have different requirements for meeting pre-sale conditions, which will also affect the progress of the project at early stage. Shanghai, Guangzhou, and Shenzhen are cities with relatively strict pre-sale conditions, and houses can only be pre-sold close to the ceiling of the building structure; In contrast, the pre-sale conditions are loose for some cities in the North China (e.g. Qingdao, Shenyang, Jinan, Xi'an, and Tianjin), as well as cities in East China.

The data processing is based on the strictness of the pre-sale conditions. Judging from the sample data we obtained on real estate projects, the time difference from completion of ground construction to capping is generally 16 months in Beijing-Tianjin-Hebei, 17-19 months in the Yangtze River Delta, and 10-12 months in the Pearl River Delta. These time differences among regions are most likely caused by the different pre-sale conditions. For example, the Pearl River Delta has the strictest pre-sale conditions. For developers, they have to complete the building structure earlier in order to obtain the pre-sale certificate. After capping, plastering and framing, the final step is the installation of glass windows and doors. During this process, the actual use of the float glass may be 1-3 months ahead of installation. When we performed data fitting, we found that the best fit in Tianjin, Beijing and Hebei is 6 months after the capping, and 9 months in the Yangtze River Delta and Pearl River Delta.



**Figure 4. Timeline of real estate construction [4]**

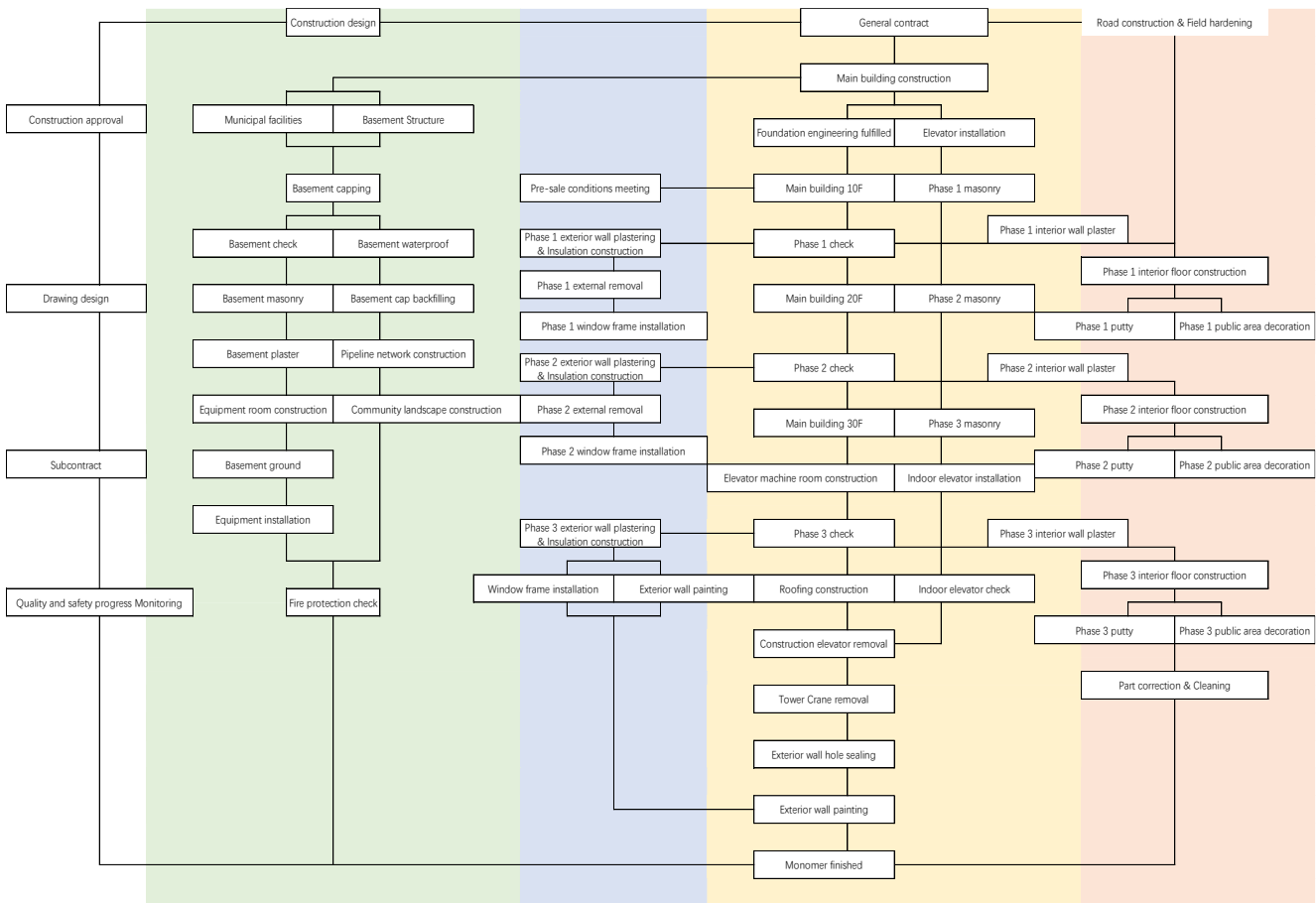


Figure 5. Process of real estate construction [5]

No.	City	High-rise building (>18F)	Mid-rise building (8-17F)	Multi-story building (4-7F)	Villa
1	Shanghai	Building structure 2/3	Building structure 2/3	Building structure capping	Building structure capping
2	Guangzhou	Building structure 2/3	Building structure 2/3	Building structure capping	Building structure capping
3	Shenzhen	Building structure 2/3	Building structure 2/3	Building structure capping	Building structure capping
4	Qingdao	Building structure 1/3	Building structure 1/3	Building structure capping	Building structure capping
5	Shenyang	Building structure 1/4	Building structure 1/4	Building structure 1/2	Building structure capping
6	Jinan	Investment 25% Building structure 1/4	Investment 25% Building structure 1/3	Investment 25% Building structure capping	Investment 25% Building structure capping
7	Xian	Foundation engineering fulfilled	Foundation engineering fulfilled	Foundation engineering fulfilled	Foundation engineering fulfilled
8	Tianjin	Foundation engineering fulfilled	Foundation engineering fulfilled	Foundation engineering fulfilled	Foundation engineering fulfilled
9	Hangzhou	Foundation engineering fulfilled	Foundation engineering fulfilled	Building structure 1/3	Building structure 1/3
10	Suzhou	Building structure 1/4	Building structure 1/4	Building structure 1/4	Building structure 1/4
11	Nanjing	Investment 25% Building structure 3F	Investment 25% Building structure 3F	Investment 25% Foundation engineering fulfilled	Investment 25% Building structure capping

Figure 6. Pre-sale conditions of different cities in China [6]

(2) Short-term lead indicators

How to select short-term lead indicators? First, according to the usage scenario where we install the window frame first and then the window sash, we know that aluminum profiles will be used before float glasses and based on the sample data we obtained on real estate projects, the lead time is about a month. Second, the architectural aluminum profiles are mainly used in glass supporting, so architectural aluminum profile is a very suitable short-term lead indicator. Third, the aluminum profiles factories operating is sales-based production model and their orders are mainly pay in cash,

rather than delivery first and payment later. Therefore, the orders of aluminum profiles factories are true and reliable. Fourth, as the order among the various indicators related to aluminum profiles is the number of orders is before the operating rate and output. Therefore, we can use the number of orders as a first short-term lead indicator to predict the operating rate and output of aluminum profiles and then use the operating rate or the output of aluminum profiles as a second short-term indicator to predict the consumption of float glass.

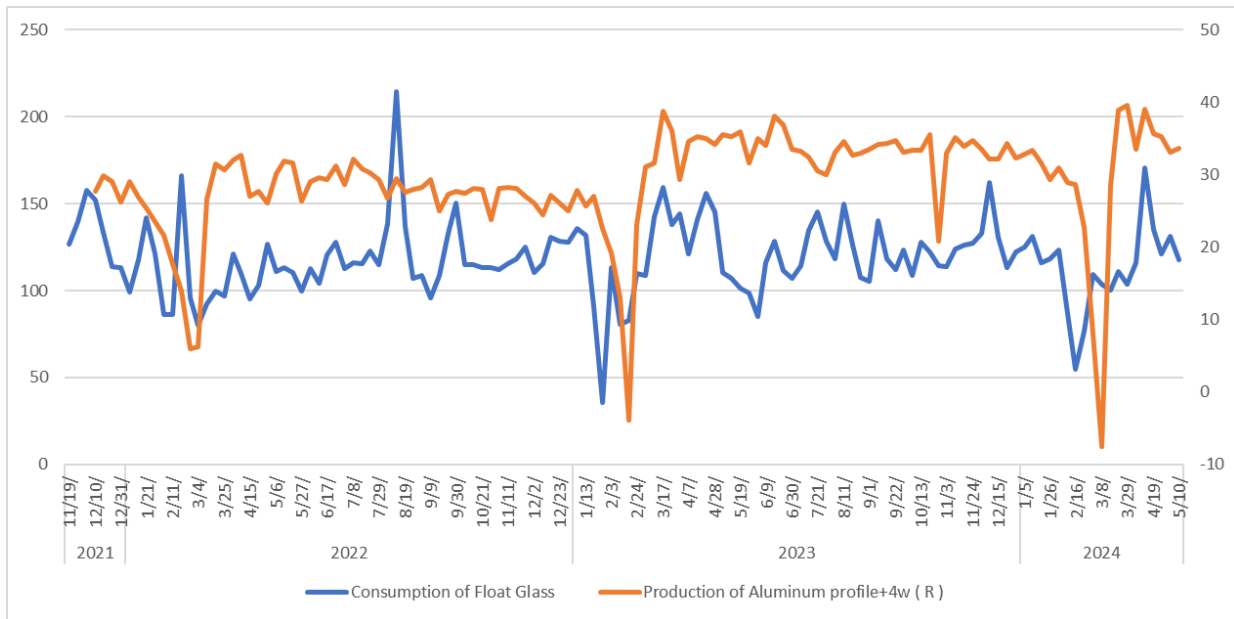


Figure 7. Production of Aluminum profiles VS consumption of float glass [7]

### 3.2. Speculative Demand

Speculative demand is not the demand that needs to be immediately produced and applied to the terminal industries, but more based on optimism about the future price of the product so that the stocking reserves are made beyond the normal needs. Midstream traders and downstream glass processing factories are important participants in float glass speculative demand. The emergence of concentrated speculative demand is more likely to lead to the trend of price increases and decreases. By monitoring the inventory level of the midstream and downstream, we can know whether current inventory levels are high or low compared to historical data and based on this, we can further judge what the purchasing intentions of the midstream and downstream will be in the near future. Usually under extremely low inventory levels, there is a greater probability of midstream and downstream purchasing intentions increasing later, by the meantime, product prices often fluctuate at the bottom and waiting for a rebound period. On the other hand, when inventory levels are high, there is a high probability that midstream and downstream purchasing intentions will weaken later, and product prices will often face the risk of falling back.

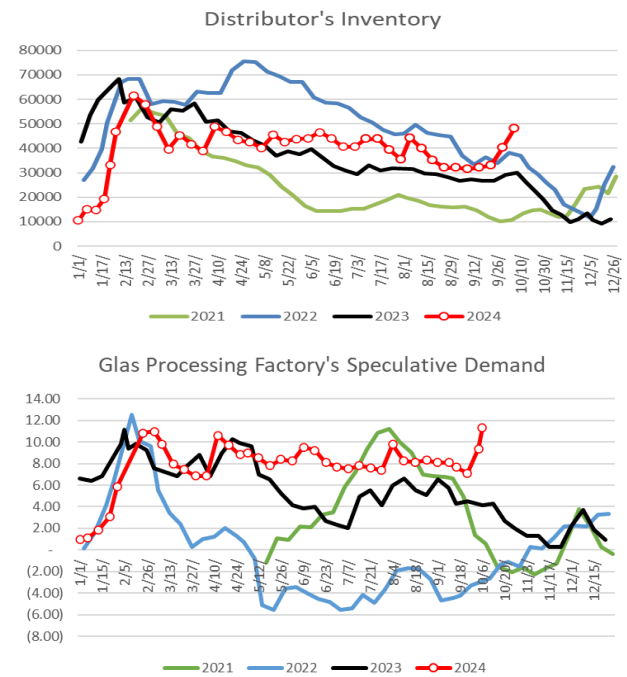


Figure 8. Midstream and downstream inventory level of float glass [8]

## 4. Conclusion

Based on the forecast analysis of supply and demand, we can better judge what the future supply and demand balance of a product will be and extend to predict future price trends of the product.

## Acknowledgements

Thanks to my dear colleagues Mobo Li and Junxia Li, who gave me a lot of help in translating this paper.

## References

- [1] General Administration of Customs of China, Kaifeng Investment data system.
- [2] Kaifeng Investment data system

- [3] Oilchem.net, Chem99.com
- [4] Qianjin: Real Estate Development Process (China Market Press, China 2015), p.232
- [5] Qianjin: Real Estate Development Process (China Market Press, China 2015), p.262
- [6] Government Website of different cities in China.
- [7] My steel, Kaifeng Investment data system
- [8] Kaifeng Investment data system