

Michael Anderson
Chief Investment Officer

**INTELLIGENT
INVESTING**

Hi-Line Capital Management, our intrinsic value-based investing is best viewed over the long-term. It incorporates the need for an in-depth analysis, long-term thinking, risk reduction, proper temperament, and independent thought and conclusions. We believe our investments have an employable competitive edge, and our insight papers, *Intrinsic Value Analysis*, provide a summary of some of the various elements crucial to our analysis and investment thesis.

**ABOUT HI-LINE CAPITAL
MANAGEMENT**

Hi-Line Capital Management, LLC ("HLCM"), based in Watertown, SD, provides investment management and advisory services for institutional and individual clients. The firm founded in July 2009, became a registered investment advisor (RIA) with the U.S. Securities and Exchange Commission ("SEC") in March 2010.

STRATEGY SPOTLIGHT: *October 2022*
TAIWAN SEMICONDUCTOR MANUFACTURING

The following is a summary intended to review various elements including: an overview about the company and management, what are its competitive advantages, and price versus estimated intrinsic value.

BUSINESS OVERVIEW

Taiwan Semiconductor Manufacturing Company (TSMC) is an independent manufacturer of semiconductors ("chips") which are used in computers, phones, automobiles, rockets, and any product requiring electronic brains. TSMC is one of the most vital companies in the modern world. Around 20 years ago, the semiconductor industry began to bifurcate by largely separating the design of chips and the manufacturing of chips. Intel and Samsung are about the only examples of companies continuing to both design and manufacture their chips. Other companies like AMD, Nvidia, Qualcomm, and Apple design chips but outsource manufacturing to companies like TSMC. TSMC is an independent operator and does not compete with chip designers. Apple uses TSMC for its sophisticated chip manufacturing largely due to the independence of TSMC. Twenty years ago, there were 20 independent chip fabrication manufacturing companies of roughly equal size. TSMC now possesses 50% market share and got market share for advanced chip manufacturing by a wide margin.

The advancement of computing power, speed, and energy efficiency within a chip depends on the size of the transistor. The smaller the transistor, the faster, better, and more efficient the chip. Currently, the most advanced chip contains transistors sized at 5 nanometers. A nanometer (nm) is 1 millionth of a millimeter. In comparison, a strand of human hair is 75,000 nm and human red blood cells are 6,000 nm. An advanced chip may contain up to 100 layers of materials with some layers one atom thin. Manufacturing a chip containing 5nm transistors is perhaps the most complicated device ever made. For example, the Apple A15 processor contains 16 billion transistors, which is made by TSMC. TSMC has 90% market share in the most advanced chips as classified by transistor size.

COMPETITIVE ADVANTAGES

TSMC's competitive advantages can be best understood by inversion. To become skilled at leading chips like 5nm sized transistors, a company must spend \$15+ billion dollars becoming skilled at 7nm sized transistors. To become skilled at 7nm sized transistors, a company must spend \$15+ billion dollars becoming skilled at 10nm sized transistors. To become skilled 10nm sized transistors, a company must spend \$15+ billion dollars becoming skilled at 13nm sized transistors...and so on. And each advancement takes 3-5 years to complete. In addition to engineering skills, operating skills are required to maximize the yield of each chip produced (which is a 3-month process). For example, one speck of dust will ruin a chip. And several specks of dust may ruin an entire wafer. This requires a fabrication clean room has 1,000 fewer airborne particles than a hospital operating room.

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TSMC's competitive advantages are enhanced by industry economics. There are four requirements to building a leading-edge fabrication plant: engineering and operational knowledge, three to five years of construction, committed orders from customers representing a high percentage of chip-making capacity, and \$15-20 billion. TSMC outspent, outsmarted, built deep relationships with designers, and operates conflict-free (unlike Samsung). TSMC is currently monopoly on leading-edge chip manufacturing and its continued investment in the next generation of chips should further enhance its competitive position.

PRICE VS INTRINSIC VALUE

Scale matters and TSMC is the largest. It currently produces 16+ million wafers sized at approximately 12 inches in diameter (and each wafer contains 50-150 chips). Each wafer takes 3-4 months to manufacture and generates approximately \$4,000 per wafer in revenue. TSMC's operating margins are consistently 40%, which results in a 16-20% return on tangible assets. Given its minimal leverage, the return on tangible equity is 25-30%.

It will likely continue to grow consistently in the future and should double in size within ten years. As an example of its natural growth capabilities, the iPhone provides an illustration. TSMC will generate at least \$40 in chip revenue for every iPhone sold...and each subsequent iPhone version will contain more chips per phone resulting in more revenue for TSMC for every future iPhone sold.

A conservative baseline outlines owner's earnings at \$25+ billion which is approximately \$15 per chip produced. The stream of owner's earnings is judged resilient to many stress-tested events including inflation, recession, and covid threats. The stream of owner's earnings results in intrinsic value of at least \$450 billion. And the natural tailwinds of demand, pricing power, and competitive advantages suggest the intrinsic value may also double within ten years. Presently, the market is pricing TSMC at a 25% discount to a conservative appraisal of intrinsic value.

Risks to the business include the continued requirement of executing the sophisticated process of producing leading edge devices and maintaining its leading-edge engineering skills. Perhaps the biggest risk is geopolitical. China maintains a "one China" stance which includes Taiwan while the USA has maintained a protectionist stance largely due to the importance of TSMC to the U.S. and its allies providing a "silicon shield" to a degree. The U.S. has increasingly restricted the selling of advanced chips to China thereby further eroding the US-China relationship. These risks are continuously monitored.

IN CONCLUSION

Owner's earnings are largely protected from negative inflationary effects, pricing is protected by its lack of competition, and its ability to grow revenue is nearly assured given the world's needs for electronic brains in all things. TSMC's economic moat includes high barriers to entry, high switching costs for designers, its technological expertise, and its position as "Switzerland" by not competing with customers. TSMC is classified as a "great business" now available at a very good price.