

AMD's Game-Changing Move: \$50bn Xilinx Acquisition is Shaping the Future of Computing

Richard Stoppel, Federico Mejía Enriquez

May 16, 2023

“Joining together with AMD will help accelerate growth in our data center business and enable us to pursue a broader customer base across more markets.”

– Victor Peng, Xilinx CEO

Deal Overview

- **Acquirer:** Advanced Micro Devices, Inc. (AMD) (NASDAQ: AMD)
- **Target:** Xilinx, Inc., (NASDAQ: XLNX)
- **Industry:** Technology, Semiconductor
- **Transaction Amount:** \$50 billion
- **Announcement Date:** October 27, 2020
- **Transaction completed:** February 14, 2022
- **Target Advisor:** Morgan Stanley & Co. LLC
- **Acquirer Advisor:** DBO Partners LLC

On Oct. 27, 2020, Advanced Micro Devices (AMD), a leading semiconductor company that designs and manufactures high-performance computing solutions, announced its plan to acquire Xilinx, the Field-Programmable Gate Array (FPGA) industry leader. Preliminary to the acquisition, AMD formed a merger subsidiary (sub) named Thrones Merger Sub. After the operation, Xilinx continued as the surviving corporation and a wholly owned sub of AMD. The merger was structured as a tax-free all-stock transaction, converting a share of Xilinx common stock into 1.7234 shares of AMD common stock valuating Xilinx at \$35bn at the time of the announcement. This exchange ratio was fixed and couldn't be adjusted for any fluctuations in market prices. In the months leading to the transaction AMDs stock valuation climbed, resulting in a final transaction amount of \$50bn, making it the largest deal in the semiconductor industry's history.

The combined company brings together AMD's expertise in high-performance computing and Xilinx's leadership in FPGA technology to extend the product portfolio. Design engineers value that FPGAs help to accelerate time-to-market compared to longer, more expensive design cycles of other non-programmable specific application chips. Furthermore, AMD expects to generate significant revenue synergies through cross-selling opportunities and operational synergies in R&D, by combining its CPU (central processing unit) and GPU (graphics processing unit) with Xilinx's complimentary FPGA and System-on-Chip (SoC) technology to create more powerful systems to meet rising demand for computing power. The deal is also

projected to achieve \$300mn in cost synergies within 18 months after the integration.

Overall, the acquisition aligns with AMD's strategy of expanding into new markets and creating a leading portfolio of technologies for data centers, embedded devices, and beyond.

Company overview – Advanced Micro Devices

AMD was founded in 1969 in Silicon Valley by Jeremiah (“Jerry”) Sanders. In 2014 former chief operating officer Lisa Su was appointed CEO and immediately restructured the firm. This was meant to stabilize revenue but came at a price, placing the company on the brink of bankruptcy in 2015 (See Figure 1 – AMD stock price). Eventually, the firm recovered and reached its record height stock price in late 2021.

Development of AMD's stock price



Figure 1: Source: FactSet - own illustration

Nowadays, the company structures its operations into four focus markets: PCs, Embedded, Gaming, and Data Centers, which allows it to diversify the revenue streams that were viewed as too consumer centric. Including the product portfolio from the Xilinx acquisition, AMD is extending its Embedded’s and Data Center’s total addressable market (TAM) to \$79bn, leading to an estimated TAM of \$135bn for the combined company.

Composition of AMD’s combined TAM after acquisition

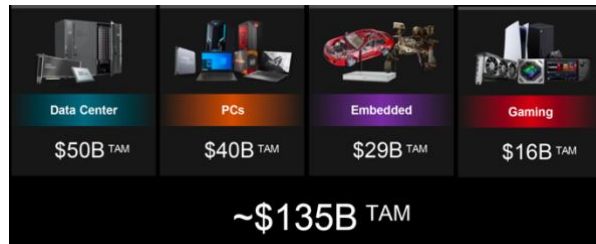


Figure 2: Source: Investor presentation, Feb. 14, 2022, amd.com

Fundamentally, AMD shows a solid financial performance despite several headwinds (see “State of the Industry”). In just a few years, it reached nearly \$24bn worth of revenue. Furthermore, the revenue increased from just \$6.73bn in FY19 to an impressive \$23.6bn in FY22. Also, the management achieved cutting costs leading to a steady improvement of operational margins, which peaked in FY 21 at 22.4%, which was still lower than main competitor Intel’s 27.7%.

AMD’s annual revenue in billion USD

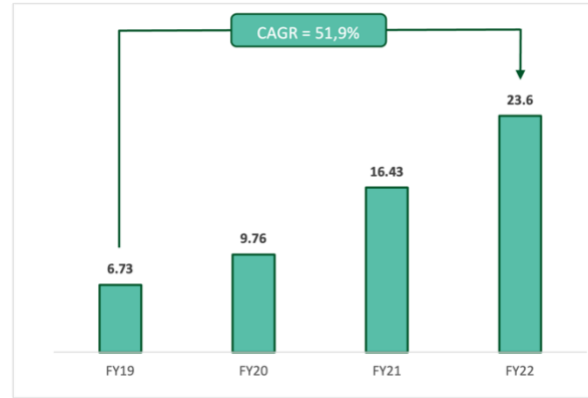


Figure 3: Source: FactSet - own illustration

Company overview – Xilinx, Inc.

Xilinx, Inc. was co-founded in 1984 by Ross Freeman. Freeman’s idea behind the company was to provide a logical device that the customer could program to fulfill special tasks rather than having to purchase a preprogrammed one. This was the birth of the first commercially viable FPGA, an integrated circuit that, as field-programmable indicates, could be configured after manufacturing. In addition, the firm introduced a process innovation to the market, the fabless manufacturing model, that allowed Xilinx to reduce costs for the relatively expensive FPGAs by outsourcing manufacturing to Japan. In FY18, Xilinx reported revenue of \$2.47bn and an EPS of \$1.89. Over the next three years, the company continued to increase its revenue to \$3.15bn and its EPS to \$2.62 in FY 21. This represents a revenue CAGR of approx. 8.4% over the past three years and an EPS growth of 38.6%.

Development of Xilinx stock price



Figure 4: Source: FactSet - own illustration

Xilinx offers a wide variety of FPGA and SoC (chips that integrate main parts of a computer system, like CPU and GPU solutions). Among them are accelerator cards, software tools for high-performance computing, and customized digital circuits and systems. These solutions target diverse industries such as aerospace, defense, automotive, communications, industrial automation, and data center.

Product portfolio offered by Xilinx

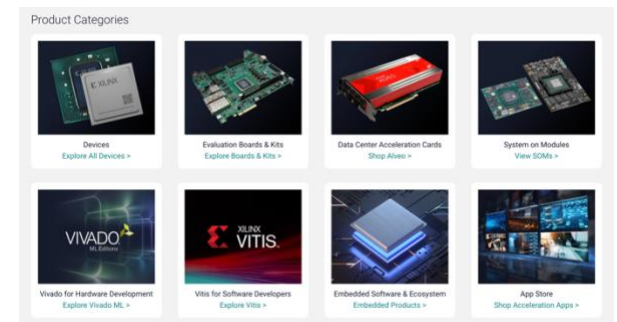


Figure 5: Xilinx product portfolio; Source: xilinx.com

A core part of Xilinx’s strategy over the past years was to have substantially high R&D expenditures ranging between 24.6% and 28% of revenue in the last five years, which is above the industry average of about 20%, according to the Semiconductor Industry Association (SIA). AMD, for comparison, invested 17.3% of its revenue in R&D in 2021. Therefore, AMD emphasizes the combined R&D to unlock operative synergies.

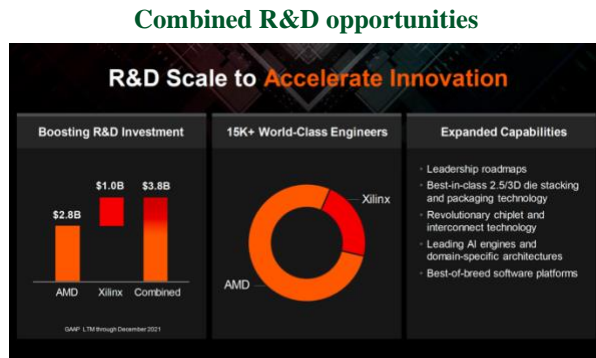


Figure 6: Source: Investor presentation, Feb. 14, 2022, amd.com

State of the Industry – Semiconductors

Over the past few decades, the semiconductor industry has experienced significant growth reaching \$618bn in 2022, according to Gartner. The rise of AI, IoT, cloud computing, and web 4.0 has further spurred recent demand for semiconductors. However, semiconductor markets are also subject to cyclical fluctuations, with periods of high demand followed by oversupply and declining prices. In 2022 companies faced the most aggressive rate hike in decades, bloated inventories, and uncertainty over the U.S.-China relationship, leading to

plumbing company valuations. Regardless, there is evidence in past data, as shown in Figure 6, that the cycle’s bottom might be reached soon, given that the PHLX Semiconductor Sector Index (SOX), an important indicator of the industry’s health, which is composed of 30 companies and weighted by capitalization, is below the historical median over the past two decades.

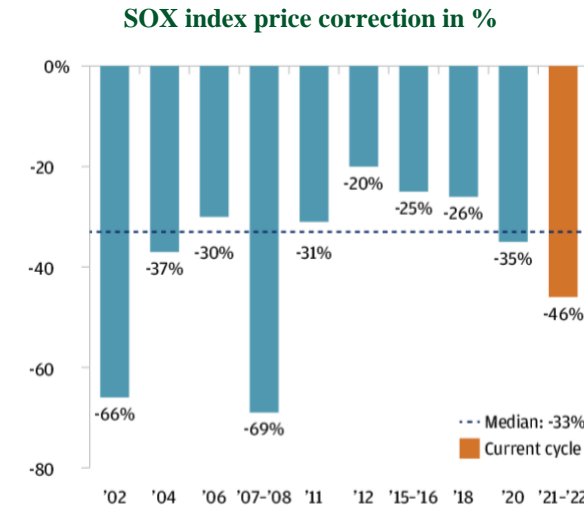


Figure 7: SOX index price correction in %; Source: privatebank.jpmorgan.com

Most analysts predict a global decline in revenue of about 4% for the current year. Against these headwinds, a paper from the Semiconductor Industry Association (SIA) and BCG estimated a long-term increase in demand of 56% by 2030. McKinsey forecasts a 7% annual growth, resulting in a market size of \$1,065bn by 2030, while other forecasts talk about a market value of \$1,380bn in 2029, resulting in a CAGR of 12.2%.

Global semiconductor market value by vertical in billion USD

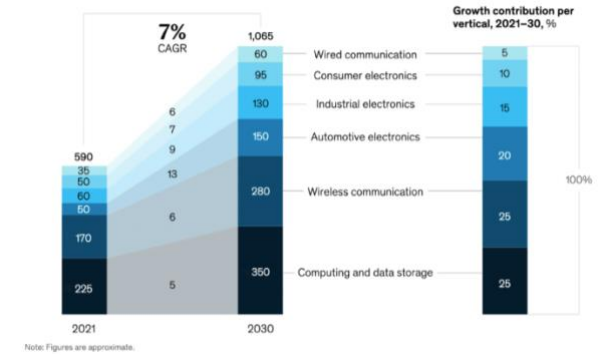


Figure 8: Source: mckinsey.com

The semiconductor industry is highly competitive, with several major players constantly creating smaller, more powerful semiconductors resulting in the increasing complexity of the chips. This has led to rising costs and longer development times, making it more challenging for smaller players to compete. Therefore, consolidation is a common trend, and M&A is critical for a competitive edge in this environment. Compared to main competitors such as Intel, with 438 transactions or Qualcomm, with 173, AMD’s M&A activity was relatively moderate, with only 31 deals. However, the Xilinx transaction is one of the reasons AMD surpassed its long-time arch-rival Intel in terms of market capitalization in 2022.

Deal Structure

Since the deal has already been closed, we focus on the actual income statement data regarding the forward-looking next twelve months (NTM) sales and EBITDA to conclude ex-post whether the transaction price was reasonable. The construction of the set of suitable comparables (comps), where influenced by the market’s consolidation dynamics. The chosen comps were divided into two subsets, more direct mid-cap competitors (e.g., Lattice Semiconductors, Microchip Technology) and overall large-cap competitors (e.g., Texas Instruments, Broadcom).

AMD’s announcement offering on October 27, 2020, valued Xilinx at an EV/Sales multiple of approx. 10x and an EV/EBITDA multiple of approx. 35.4x resulting in an enterprise value (EV) of about \$35bn. In contrast to this offering, Xilinx was trading at 8x EV/Sales and 28.4x EV/EBITDA, which results in an EV of about \$28bn. Hence, AMD intended to pay a premium of around 25%.

Compared to the whole comps set’s mean and median of 7.8x EV/Sales, Xilinx appears to be in the center of the price range. Although looking at the EV/EBITDA multiple, which tells more about the ability to generate cash flow, we see that its 28.4x multiple is significantly higher than the set’s mean of 22x and median of 15x.

As we discussed earlier, key value drivers are technology and expertise, manifesting in R&D activity. Therefore, we would like to introduce the EV/2Y R&D Average multiple. Xilinx shined with a 33.1x compared to the mean of 40.1x and median of 48.5x, indicating its relatively favorable valuation in terms of innovation.

Trading comparables analysis

Company Name	Market Data*			Financial Data				Trading Multiples		
	Price (\$/share)	Market Cap (\$Bn)	EV (\$Bn)	Sales (NTM)** (\$M)	EBITDA (NTM)** (\$M)	2Y R&D Avg. (%)	EV/Sales	EV/EBITDA	EV/2Y R&D Avg.	
Xilinx Offer price***	142.29	35.82	39.71	3,47	0.98	0.84	10.0	35.4	42.3	
Xilinx	114.55	28.82	27.81	3,47	0.98	0.84	8.0	28.4	33.1	
Mid-cap comps										
Lattice Semiconductor	41.03	5.85	5.85	0.48	0.15	0.08	12.2	39.0	73.1	
Microchip Technology	54.87	32.06	39.94	6.04	2.66	0.80	6.6	15.0	49.9	
Maxwell Technology	40.08	28.44	29.03	3.46	0.88	1.07	8.4	33.0	27.1	
Large-cap comps										
Texas Instruments	145.95	137.00	137.20	17.59	9.27	1.54	7.80	14.80	89.09	
Broadcom	363.04	164.46	163.45	26.51	15.85	4.83	7.30	12.21	46.05	
Intel Semiconductors	134.89	38.91	45.02	30.53	3.90	1.66	4.28	11.54	27.12	
Statistical Summary										
First quartile							6.6	12.2	29.1	
Mean of entire set							7.8	22.0	48.5	
Median of entire set							7.8	15.0	40.1	
Third quartile							8.4	33.0	73.1	
Relative Valuation										
	Trading Multiple			Implied Enterprise Value			Implied Share Price			
	Sales	EBITDA	2Y R&D Avg.	Sales	EBITDA	2Y R&D Avg.	Sales	EBITDA	2Y R&D Avg.	
First quartile	6.6	12.2	27.1	22.95	11.96	22.79	95.29	51.78	94.67	
Mean of entire set	7.8	22.0	48.5	27.05	21.55	42.75	111.57	89.76	165.80	
Median of entire set	7.8	15.0	40.1	27.07	14.71	33.64	111.61	62.68	137.66	
Third quartile	8.4	33.0	73.1	29.11	32.33	61.43	119.72	132.46	247.71	

Figure 8: Source: FactSet – own illustration

Based on the relative valuation that demonstrated that all multiples are close to the centric values, we can conclude that both the initially intended valuation at the exchange rate of 1.7234 and the premium of 25% were reasonable. Nevertheless, the fixed exchange ratio and the subsequent rise in AMD’s stock price catapulted the valuation of Xilinx to \$50bn and the acquisition premium to 72%.

After closing, this has led to an increase in AMD’s intangible assets position, which they had to and still have to write down. This is reflected in the income statements of the last three fiscal quarters, where D&A expenses have risen above \$1bn, causing significant operating losses and, in Q1 2023, even a net loss of \$139 million. This signals that they might have overpaid.

Potential Risks & Potential Upsides

A key risk we identified for AMD is the need to keep up with the pace of innovation, even though the firm has been a leader in this field. Despite stronger growth than its competitor Intel, AMD still needs to catch up to it in terms of R&D expenditures as % of revenue. Since Intel is at comparable levels to Xilinx, the acquisition alone

doesn’t erase this difference but certainly is a step in the right direction.

Supply chain risks are also significant. Especially the concentration of semiconductor fabs in Southeast Asia could be a worry, provided that the geopolitical situation remains uncertain in the mid to long term. AMD, though, might still not profit from this as they switched from global foundries to TSMC as their manufacturing partner. The US Government has previously imposed restrictions for semiconductor exports into certain countries for American firms. In a scenario of military intervention by China and other big end markets in international conflicts, these export restrictions may rise, and even bans could be established. This would impact the entire industry’s revenues.

The manufacturing of substrate, which is a core material used in semiconductors, has been a weaker link in the semiconductor supply chain with low margins in the past years and therefore has experienced relative underinvestment. This could lead to a bottleneck in the supply chain and makes companies strategically compete for mid to long-term access security to the substrate material.

AMD currently designs 83+% of all gaming chips, resulting in a slight dependency on customers who could change to other suppliers, thereby rapidly decreasing AMD’s market share and undermining their core client segment. On the other hand, gaming is a huge growth market, and AMD has earned clients’ trust, which might give them priority access even if the gaming products are going to change on a technological level in the future.

We estimate the risk of new market entrants to be relatively low as scale brings vast advantages, and therefore new entrants are likely to be acquired by bigger players.

Due to the slowdown in further shrinking chips in research labs, we've seen increased demand for specialized chips. We've thus seen great success in the strategic partnerships AMD formed with Microsoft and Google, Amazon, and alike to continue to help them push the performance of hardware for their applications. We see these partnerships with immediate clients help AMD expand its reach and build bigger economic moats.