MV CAPITAL MANAGEMENT

Weekly Market Flash

Questions About Quantum

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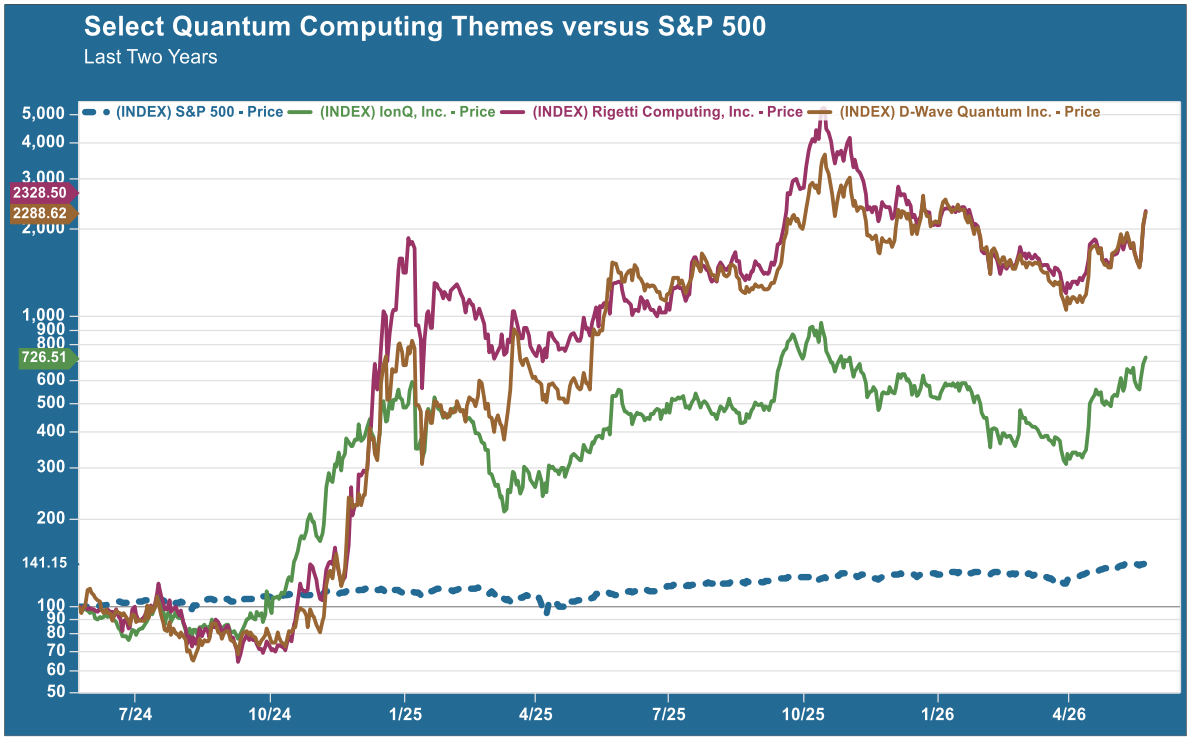
Nobody understands quantum mechanics. That's according to the late Richard Feynman, and as one of the greatest physicists of the twentieth century, he was in a good position to opine on the subject. As mind-bendingly counterintuitive as the subject is, though, it is showing up in all kinds of technological spaces these days. Including the stock market. The chart below shows the two-year performance of three companies engaged in various approaches to the challenge of developing a quantum computer: IonQ, Rigetti Computing and D-Wave Quantum. That blue dotted line plodding along below these three companies is the S&P 500.



Source: MVF Research, FactSet

The Qubit of It All

The above chart reflects not just the eye-popping returns for these companies, but also the considerable risks involved for something that…well, doesn't quite exist yet in a fully functional form. If you bought into Rigetti Computing two years ago, you would be up more than two thousand percent cumulatively. If your cost basis was October 2025, on the other hand, you would be down by minus 54 percent as of today's prices -- good for tax loss harvesting against all your AI winners, maybe, but not much else.

So where exactly are we in this brave new world of computers powered by qubits? Unlike the ordinary bits that make up the building blocks of classical computers, each of which can take a value of either zero or one at a discrete point in time, qubits can exist in a so-called superposition of all states between those numbers at the same time. That should give quantum computers vastly superior performance over their classical peers in the run-time needed to solve extremely complex problems.

But getting these qubits to behave properly is a daunting challenge. A qubit works – for the purpose of quantum computing – when it is in that superposition state, but it only remains that way for a tiny fraction of a second. Adding more qubits to a system creates interference as individual qubits pop in and out of their fragile superposition states, creating an unwieldly amount of cross-talking noise. That makes it hard to scale up to a size commensurate with what would be considered a fully operational quantum machine. There is considerable debate among experts in the field as to when this scalability will be achievable – from a couple years from now to a quarter century or more away. That's a pretty wide time gap.

All Roads Lead to Somewhere

Which of the various technologies being tried out today will get to that big milestone of an industrial-size quantum computer with acceptable levels of interference? Are we going with superconducting circuits, or trapped ions, topological qubits or other modalities that so easily roll off the tongue? Right now – as the above chart suggests – investors are casting their nets wide rather than going all-in on any one thing that may wind up a dead end. The parallels with artificial intelligence can be seen here, where a thousand flowers bloomed and faded in the world before ChatGPT (and arguably, that debate is not finalized either, as the race for less costly and energy-intensive systems with fewer hallucinations continues in AI land).

Steady progress is being made, though, and along with the potential benefits from quantum computing in areas such as drug discovery, there are plenty of threats. One of the first practical uses identified for a machine running on qubits was cryptography, or the ability to crack the most complex of security codes. That presents an obvious challenge to the integrity of cybersecurity systems. In today's Financial Times, an article titled "Crypto industry braces for quantum threat" described how a post-quantum world could pose a lethal threat to the security of the code powering the blockchain, upon which the cryptocurrency bitcoin rests. As if we didn't already have enough to worry about with AI hacking superpowers like Anthropic's Mythos out there lurking around. Whether it's two years or two decades, we need to be plugged into what is going on in the trippy quantum world, ready to take advantage of the opportunities and to take defensive actions against the threats.

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