Long-Wave Theory and The End of the World

By CLARA BASILE AND ELLEN ULLMAN

IN THE LATE 1980S, THE WORLD WAS SUPPOSED TO COME TO AN END. ACCORDING TO WAVE THEORISTS WRITING IN 1986, WESTERN CIVILIZATION WOULD COLLAPSE IN THE WAKE OF A GRAND SUPERCYCLE—THE MOTHER OF ALL WAVES. ROBERT PRECHTER PREDICTED the beginning of the end, as did Ravi Batra in his book *The Great Depression of 1990*. When the stock market crashed in 1987, it wasn't hard to entertain post-apocalyptic, Road Warrior fantasies. Mel Gibson in heavy leathers. Parched landscapes. Pontiac Firebirds out looking for gas.

Whatever you now believe about those dramatic predictions, in hindsight we can see that a major global change did indeed begin in the late 1980s. In addition to the crash, the collapse of the Communist system in 1989 was followed by a recession and banking crisis in the United States, currency devaluations in Europe, and the bursting of the speculative bubble in Japan. This period saw recession in the so-called First World, collapse in the Second and utter destruction in the Third. (The relationship of the Communist decline to capitalist long waves requires research; we pose it here as interesting and speculative.) If you lived in Russia or East Germany, the future would look doubtful. If you lived in Yugoslavia or Somalia, the Road Warrior scenario would not be fantasy but daily life. On the other hand, if you live as we do in the United States, you may feel that the worst is past and you are already looking for opportunities in the next upcycle.

On a smaller and less dire scale, an apocalypse of sorts also occurred in the computer industry in the late 1980s and early 1990s. If you were a Digital Equipment investor, it was time to worry. If you were an IBM shareholder, you feared that the longest-running sure thing in the market was about to come to an end. If you owned Microsoft, however, you had the satisfied feeling of being in at the conception of the next long-running sure thing.

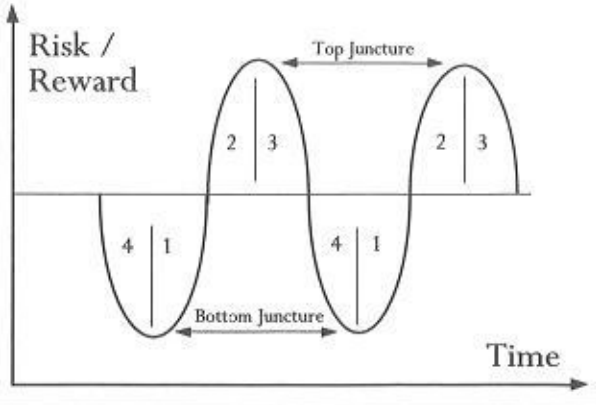
While we don't intend to fix easy analogies (the U.S. = Microsoft, the Soviet Union = IBM), we *do* want to show that a similar method of analysis—wave theory—can be applied at multiple levels of granularity. Using numerical analysis of cycles, we can investigate subjects ranging from the world, down to single countries, industries, sectors and individual stocks. We can examine time series ranging from generational secular trends (10 - 30+ years), to long range trends (the 4 - 4 1/2-year business cycle), to intermediate trends (the 6 - 9-month cycle).

At each level of granularity—the world to a single stock—our analysis is based on the idea that asset prices move through a typical four-phase cycle modeled on the sine wave (Figure 1). As capital flows out of an asset, the price falls (phase 4), until all negative information about the asset has been discounted by the market. The price eventually reaches a bottom juncture, where it is poised for an uptrend on any new, positive information. On good news, or at least on the perception that all bad news has been discounted, capital begins flowing *into* the asset (phase 1). The uptrend continues (phase 2) until all positive news has been discounted. Capital then flows out (phase 3), establishing a downtrend that accelerates through phases 3 and 4, eventually flattening as the price approaches a new bottom juncture.

While the four-phase model appears straightforward, before we can make money using cycle analysis, there are several complexities we have to take into account. The first difficulty, of course, is matching the cycle phases to time. We want to know where in the cycle we are today. The answer usually is sought by visual inspection of prices over time, a subjective method in which price trends usually do not become apparent until after the fact. To track trends more closely, we use instead proprietary algorithms based on price, a method that frequently anticipates trend changes.

A second complexity involves the interaction of longer and shorter cycles. A bullish or bearish secular trend skews the shape of

Figure 1: **Four-Phase Model of Capital Flow**



the wave. (Figure 2 shows a bullish secular trend.) Rather than a simple sine-wave oscillation—going up half the time and down the other half—the wave is biased in either the up or down phases of the cycle. And, since the secular trend is simply a wave like any other, we must know when the secular trend itself is poised for change, because this change will affect the bias of shorter cycles. Our mathematical model, then, calculates the interaction of the longer and shorter cycles, especially the extent and direction of the skew in long and intermediate cycles under the influence of the secular trend.

Our investment methodology is not a black box where numbers go in and buy/sell decisions come out. The methodology itself involves a certain amount of educated feel, judgment and art. And numerical analysis, on its own, is not always sufficient for guiding our decisions. In our application of cycle theory in this column, we'll use a combination of numerical and scenario analysis. Our goal is to make profitable investment decisions by knowing the answers to two basic questions: 1) Are prices poised for change? and 2) What new information can make the potential price change happen?

The answer to the first question—are prices poised for change?—is our departure point. We'll address this question using numerical analysis, looking mathematically for maturing and flattening trends. Then, to find out if there's some pertinent piece of news about the asset or sector, we'll ask ourselves, What's going on to support our numbers? When we can, we'll propose a scenario that reinforces our numerical findings. Where we don't know of a ready scenario, we'll call on other analysts, and on readers, to offer one. We believe we *can* make profitable decisions based primarily on the numbers, but scenarios can give us a deeper understanding of the trends. At the very least, scenarios can give us the courage to stick by our numbers when things don't immediately unfold as expected.

To illustrate briefly our numerical/scenario approach, let's take a historical example from the work of the well-known cycle theorist Ian Notley. In a 1986 paper citing the research of Dutch economist Jacob van Duijn, Notley predicted that 1987 would see the bottom of a Kodratieff wave (54-year economic inflation/deflation cycle) coincident with the bottom of a business cycle (4 - 4 1/2-year wave). The result would be what Notley called the "demise of the 4th long wave" through 1987-90 and a deflationary contraction. In foreseeing a downturn in this period, Notley seems in line with the predictions we mentioned earlier. However, Notley's view was less dire and more balanced. He saw a milder contraction, a "soft landing," supported where entrepreneurial activity was high, as in the United States. And the most innovative countries and companies would profit from the emerging uptrend of "the 5th long wave."

What can Notley's analysis tell us about the computer industry? In looking at the period 1987-90, we can identify a juncture in the industry (see Figure 3 on page 60, based on a diagram by Notley). In our view, this juncture separates the industry into two parts, into what are essentially two industries, one succeeding the other. As we all know by now, different companies predominate on each side of the juncture, IBM and DEC being superseded by Intel and Microsoft. But the introduction of the PC alone did not create the division between the old and the new industries.

What is most significant about the PC is how *briefly* it remained a *personal* computer. Instead, something called a personal computer rapidly became a ubiquitous, multipurpose, chameleon-like computing box. One 486 is a home entertainment center playing flashy multimedia software; another is a no-nonsense, work-a-day departmental server. One laptop is a poet's typewriter; another is an executive's mobile link to a vast enterprise network. What defines a machine is not its size or the number of calculations per second it can perform—no more mainframes and minis and micros. Instead, machines get their definition from their software and their architectural place in the overall computing environment. In short, customers buy standard machines, then they use them every which way.

What was the "news" in 1987-90 that led to this shift in the industry? We believe it was the market emergence of client/server and network computing, which, in turn, moved the entire industry towards interoperation standards. Coming on the heels of the standardized PC, with its plug-in parts, the standards engendered by networking created an industry that was much more commodity-like than the one that preceded it. Enterprise computing vendors faced product differentiation challenges similar to those confronting manufacturers of PC hard drives, where the end-user had trouble telling one part from another beyond basic size and price. Under pressure to conform

Figure 2: **Four-Phase Model In Multiple Time Frames**

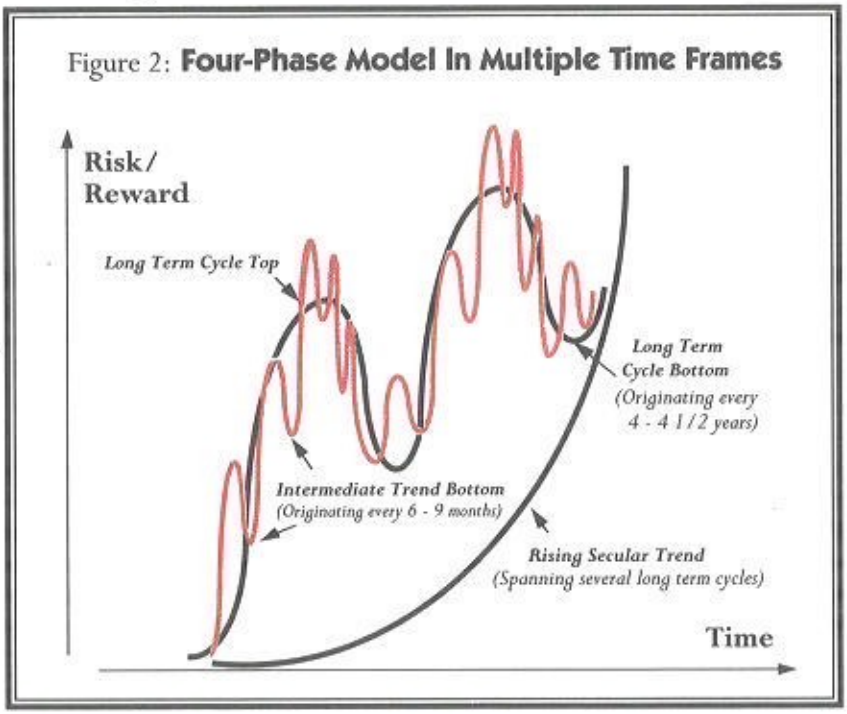
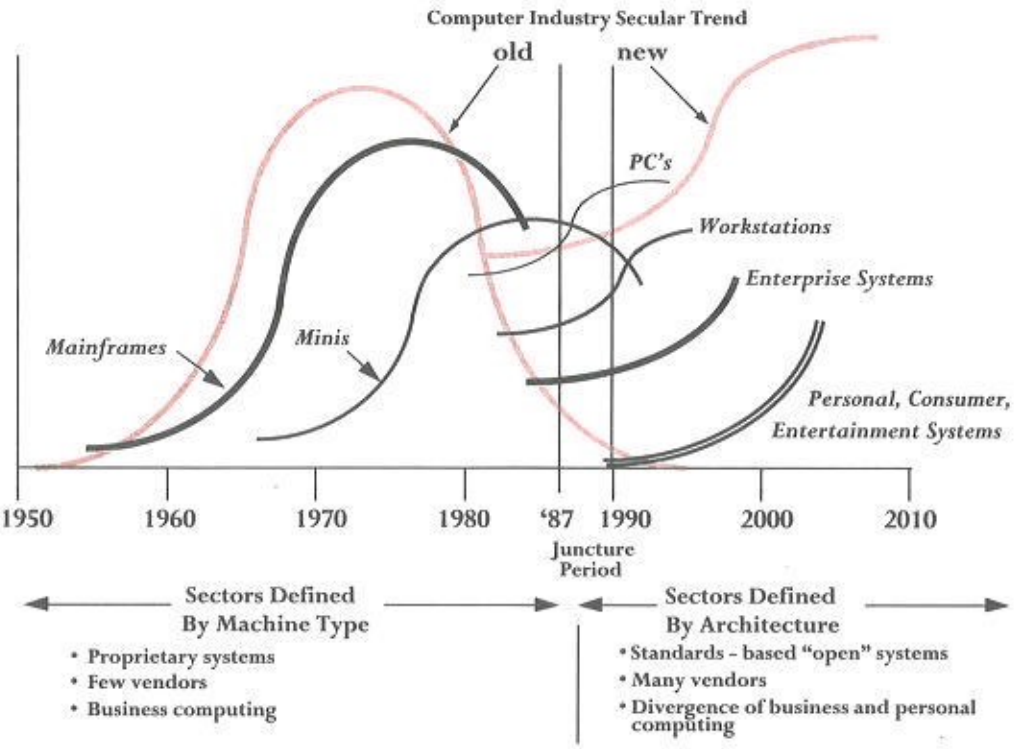


Figure 3: **Long Wave Theory Applied to the Computer Industry**



to standards while somehow standing out from the crowd, only the most innovative and creative vendors could prevail.

Networking technology began to be available in the early 1980s, but the end of the decade was a breakthrough period for client/server. As the economic contraction squeezed profits, buyers of corporate systems began looking for new and more cost-effective technologies, client/server among them. Resisting the purchase of that million-dollar second mainframe, companies instead bought workstations and used them as database servers. They bought cheap PCs and put them on a LAN. Then they wanted their PCs to talk to the workstations, and the workstations to talk to the mainframe. As the environment became more complex, users had a reasonable request: they wanted the various pieces of the system to know how talk to one another.

Vendors who wanted to sell into the growing client/server and networking market had no choice but to make their products compatible with other products on the network. Like it or not, they were forced into standards. It was a time of warring consortia and standards bodies. Eventually we had slews of official and *de facto* specifications—Win32 and OLE 2.0; POSIX and XPG, OSF and SVR4; TCP/IP, SPX/IPX, IEEE 803.2 and DCE; ANSI/ISO SQL and ODBC—the whole alphabet soup of an industry groping towards interoperability.

It was not the new networking technology *per se* which created the new computer industry; it was the increased competition inherent in the open, "plug-and-play" networked computing environment. In a world of multiple vendors selling standards-based parts, survival required creativity. To go back to Notley, only the most entrepreneurial companies could have a "soft landing." Companies like DEC and IBM faltered as they clung to their proprietary technologies and big-company ways. Meanwhile, companies like Hewlett-Packard stayed healthy by reorganizing along entrepreneurial lines and seeking out new opportunities, even with traditional competitors. (In 1991-2, the period following the industry juncture, H-P's stock outperformed DEC's by over 300%.) Innovative companies survived the downturn to prosper, and new companies, born into the rough and tumble of a commodity-like world, were necessarily created as nimble enterprises.

Space does not permit us to discuss all the details in our view of the computer industry, but we hope we have communicated how cycle theory interacts with scenario analysis. In the future, we'll leave the relative safety of historical scenarios for the more adventurous present. And, while long-wave global and industry discussions are intellectually interesting, we recognize that it's difficult to make money on the basis of long-cycle analysis alone. In this most entrepreneurial and dynamic industry, long-term investing may not be the only strategy. We'll focus instead on multiple time frame analysis. We'll look at current trends for individual stocks and industry sectors, and we'll try to explain why the numbers say what they do.

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