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The economic consequences of air conditioning

On Wall Street's authority, the Internet is the most important innovation of all time. The brokers and bankers say this without qualification, and they would have us invest in the same spirit. In general, they advise the purchase of Internet stocks without regard for price or valuation on the ground that, to them, the principal long-term financial risk associated with the worldwide web is not being invested in it. Amazon.com, eBay, priceline.com, E*Trade, Charles Schwab et al. have purportedly already conquered the future, even though they haven't seen it yet. There are no visible competitive threats to these companies, the bulls contend. Supposedly, in fact, they are already as deeply entrenched in the U.S. economy as DuPont, General Motors and Procter & Gamble ever were.

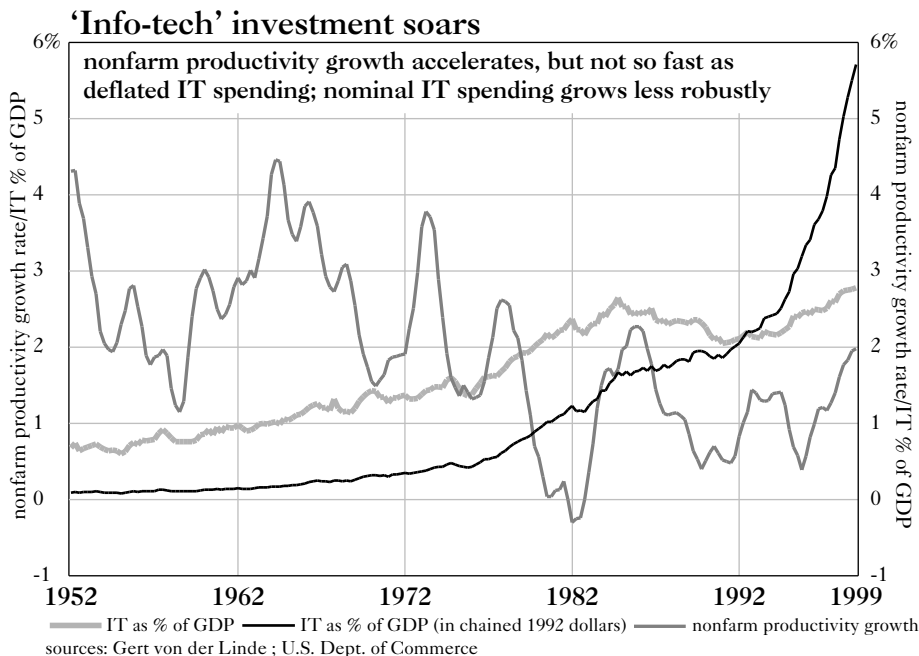
We didn't believe these claims in cold weather. At the start of a New York summer, we are even more skeptical. To those who inhabit the hazy, hot and humid portions of the physical world, the Internet will never seem so seminal an invention as the low-tech room air conditioner. Visionaries may claim that the 'net will do nothing less than create new industries, refashion old ones, enhance productivity and rewrite the script of social, economic and political life the world over. Air conditioning has done all that, and more. Yet it has so far created no financial Garden of Eden, and we think we know the reason.

The destination of this essay is the idea that the consequences of technological upheaval are complex and unpredictable. Innovations make the

world a more productive place, but also, simultaneously, in ways rarely anticipated, a less productive one. Thus, on the plus side, the Internet has unimaginably expanded the accessible store of human knowledge, up to and including bond analytics. On the minus side, it has brought day trading, e-mail and computer solitaire within the reach of every white-collar employee. It has facilitated the universal dissemination of American nuclear technology. All in all, we submit, the Internet's net contribution to U.S. productivity is considerably smaller than what is represented to be its gross contribution.

Revolutions, once begun, rarely proceed as the revolutionaries intended, and the chief beneficiaries of new inventions are not always the people

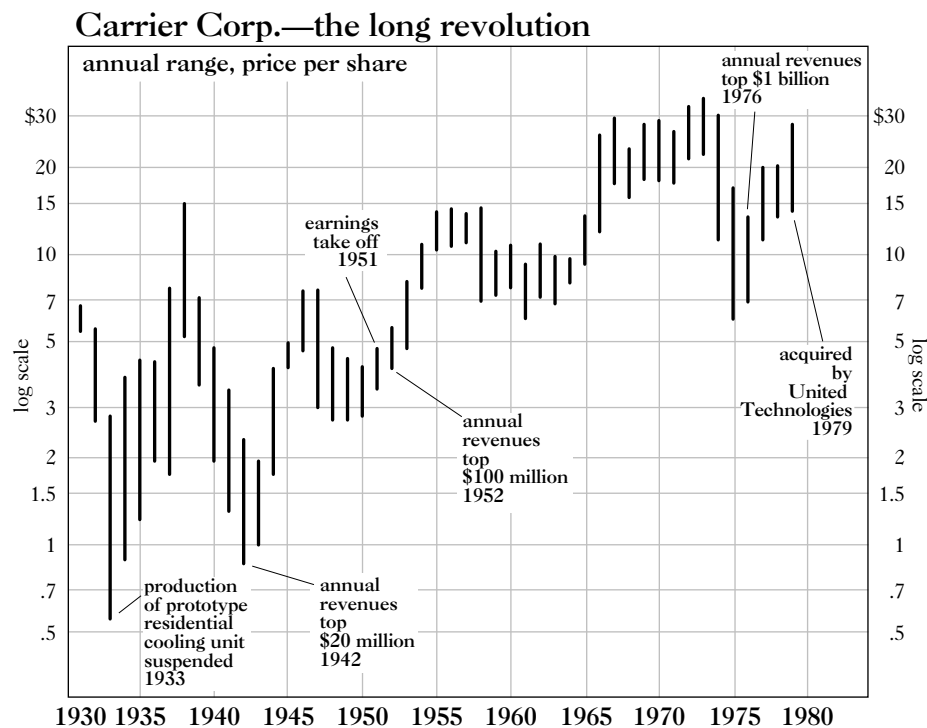
who dreamt them up, invested in them or promoted them (they are sometimes the children or even the grandchildren of those individuals). Thus, for example, when Willis Haviland Carrier was awarded patent No. 808897 for an "Apparatus for Treating Air," on Jan. 2, 1906, the father of air conditioning almost certainly did not anticipate a future hole in the ozone layer or the political consequences of a 12-month congressional session. "The installation of air conditioning in the 1930s did more, I believe, than cool the Capitol," reminisced Rep. Joseph W. Martin, a Massachusetts Republican, in 1960, "it prolonged the sessions." Would American statism have come full flower in a non-air-conditioned capital city? Always, in technology, there are debits and credits.



To leapfrog over 2,500 or so well-chosen words, our top investment conclusions are, first, that innovation constitutes no certain warranty against macroeconomic turmoil and, second, that a margin of safety is just as essential in high-tech investing as it is in the low- and medium-tech kind. Thus, as we will observe, the truly stunning gains in productivity observed in the 1950s and 1960s were followed not by human perfection but by a great inflation. And as for the Internet, we hold it in such high regard that we believe it is fully capable of developing the means to destroy itself in favor of an information technology even more wonderful.

The basic Internet trade has so far been exquisitely simple: Obtain an allocation of an online IPO. Intermediate and advanced Internet trades—those derived from the second- and third-order effects of the 'net—will undoubtedly be subtler and more complex, e.g., sell the shares of the revolutionary businesses that the revolution has begun to devour; buy the shares of the Internet's surprise new beneficiaries; and—just a possibility—sell municipal bonds. An inkling of what the Department of Unintended Consequences might hold in store is the recent alarm expressed by states and municipalities over the loss of sales taxes to e-commerce. Say "Internet" and the first thought that comes to mind is not "public finance." Yet, what is apparently going through the minds of the members of the National Association of Counties and the U.S. Conference of Mayors is a future tax famine (with potential bearish consequences for tax-exempt debt). Knowing what he knows today, would Al Gore invent the Internet all over again?

The story of air conditioning, we think, speaks directly to the risks, opportunities, hopes and delusions of the digital age. Raymond Arsenault, in a brilliant essay entitled "The End of the Long Hot Summer: The Air Conditioner and Southern Culture" (first published in 1984 in *The Journal of Southern History*), observes that the great invention did not catch on at once: "The so-called 'air-conditioning revolution' . . . was actually an evolution—a long, slow, uneven process stretching over seven decades." A



Brooklyn lithography plant was the first recipient of the Carrier apparatus, in 1902. Sales to a wide variety of industrial customers followed. But the so-called comfort market went uninvaded until the successful commercialization of centrifugal refrigeration, in 1922. When, on Memorial Day in 1925 Carrier successfully cooled the patrons of the Rivoli Theater, New York, a new day dawned. Yet almost 30 years would have to pass before the residential air conditioning market came into its own. Carrier himself wouldn't live to see it.

So unlike the digital revolution—or is it? Very much like it, in fact, with this difference: In 1999, the stock market willingly capitalizes loss-making companies. Through most of Carrier's career, it capitalized only profitable ones (or ones, at least, that started out profitably). "I fish only for edible fish," the inventor was wont to say, "and hunt only for edible game—even in the laboratory."

"[I]f you measure the progress of technology not by Mips and bytes but by how it affects people's lives and their ability to get useful work done," writes Paul Krugman in his book "The Accidental Theorist," "you realize that the last 30 years have been a time not of unexpected achieve-

ment but of persistent disappointment." Does the economist exaggerate? Not by the evidence presented in the accompanying graph. Note, first, the takeoff in "info-tech" investment, i.e., capital investment in computers, semiconductors, telecommunications equipment, etc. The size of these outlays is depicted in two ways, in current and constant dollars. In constant dollars, the expenditures increase gradually in the 1960s, sharply in the 1970s and 1980s and exponentially in the 1990s. In current dollars, there is no exponential liftoff. The reason for the flatter slope of the dotted line is the ferocious info-tech price deflation. Without an adjustment for falling prices (and rising imputed product performance, whether or not the user can actually make use of it), growth in information-related technology investment looks merely brisk, not world-beating.

The same, in fact, might be said for growth in nonfarm productivity, depicted by the third line. For a supposed New Era, the rate of improvement in output per man hour over the past few years may seem to you (as it does to us) mystifyingly slow, even following the 1996 upturn. Gert von der Linde, the unofficial *Grant's* house economist, observes that the

recovery of the past three years is itself highly unusual. As a rule, major accelerations in productivity growth begin at the bottom of recessions, not in mid-boom. By way of preface, von der Linde advises that all these numbers be taken with a grain of salt, as the concept of national income accounting is less than 70 years old. However, he goes on, taking the statistics on their face, one can see that growth in productivity is far below the rates observed throughout much of the 1950s and 1960s (despite some ups and downs, growth in nonfarm output per man hour in those two decades averaged 2.8%).

Which returns us to the story of the life and times of Willis H. Carrier. What was responsible for the productivity bulge of the Eisenhower, Kennedy and Johnson eras? The first UNIVAC computer entered service in 1951, the Boeing Dash 80 (prototype of the 707 jetliner) debuted in 1954, legislation creating the interstate highway system was signed by President Eisenhower in 1956 and the Xerox 914 copier came on the market in 1960. And it was in the fabulous '50s that residential air conditioning became a fixture.

It may give heart to the speculators in Amazon.com, eBay, priceline.com and other first-generation Internet businesses to know that Carrier Corp. is today, as it was at the time of Willis Carrier's death in 1950, the undisputed air conditioning leader. York Corp., Frigidaire, Trane Co. and Westinghouse (to name only part of the competitive field) never overtook it.

On the other hand, if you plot the stock price of Carrier in terms of the Dow Jones Industrial Average from 1929 until 1979 (when it was acquired by United Technologies), you find no prolonged outperformance. Many were the bumps on the road to a room-temperature world. In about 1933, according to a biography of the founding genius, Carrier was forced to suspend production of its prototype residential room cooling unit. There was no demand. Yes, the bulls will counter, but that was the Depression. Yes, we reply, but air conditioning did not prevent the Depression. (*Fortune* would call air conditioning "a prime public disappointment of the 1930s.") Innovation alone does not drive the world economy.

Only the most patient and long-lived air conditioning bulls were on hand to be fully vindicated. "In 1945," relates Arsenault, "in a preview of things to come, shipping magnate Henry Kaiser announced plans to build 'complete communities of mass-produced air conditioned homes....' Room air-conditioner sales climbed to over 40,000 by 1947, but at that period residential air conditioning still accounted for only 2% of the industry's business. By 1950 the figure had risen to 5%, but in most areas the air-conditioned home remained a novelty."

Not long ago on First Call, a brokerage-house analyst pronounced eBay to be cheap at 55 times net income projected for the year 2009. Such an expression of faith—in the permanence of a new technology, in the capacity of a new company to exploit it, in the predictability of the future, in the stability of civilization as we know it—appears on Wall Street only cyclically. It is in the shortest supply when it ought to be most plentiful, i.e., when values are cheap. It was conspicuously not in evidence in 1951, at the start of the home air conditioning age.

What then stood in the way of an air-conditioning stock boom was not the future but the past, the memory of bad things and the dread of more. If the market doubts nothing today, it believed nothing then. In the summer of 1951, the Dow had made a 20-year high, at 263. Then, again, it was only back to where it stood in the depression year of 1931.

"In 1951," historian Arsenault proceeds, "the inexpensive, efficient window unit finally hit the market, and sales skyrocketed, especially in the South." "With a growing population," wrote John C. Perham in *Barron's* in August 1951, "a rising standard of living, a slow but diabolical increase in yearly temperatures, and more powerful and adaptable air conditioning equipment all converging to rout any obstacles, it is hard to see serious trouble ahead for the industry." What *Barron's* didn't get around to mentioning was that Carrier Corp. traded at 5.2 times trailing net income and 2.4 times the annualized net income of its latest fiscal quarter. Then, too, at a price of 23½, the stock yielded 4.2% (long-dated Treasuries fetched 2.65%).

What digitally awaits us in the near future, we keep reading, are breakthroughs in "user interfaces" as well as communication and computing technologies. Thus, writes Richard Rowe in the April 9 edition of the *Boston Business Journal*, "In the next decade, we will see electronic ink, heads-up, hands-free displays, smart, personalized and voice-controlled appliances and mind-machine connections that will transform the way knowledge is generated, accessed and used more than any innovation since the advent of print."

Wonderful, certainly, but not clearly so wonderful as a technology that actually changed American migration patterns, that caused the "Sunbelt" to rise up out of sand and scrub and that immeasurably increased human comfort and health from Jakarta to Baltimore. Who could enjoy a life of digital interactivity with sweat pouring into his eyes?

It will be said that the Internet has revolutionized not the world of the body but the life of the mind. However, we feel, the mind is receptive to only so much revolution. Reyner Banham, in "The Architecture of the Well-tempered Environment," published in 1969, observed that air conditioning, along with electric lighting, had rendered "all environmental constraints on design" obsolete. In the new age, you could live anywhere you wanted to, and in any kind of house (thank you, John Newman).

Yet, Banham went on, "[T]he possibility of absolute variety and infinite choice of building form is now with us—and as so often happens with infinite choices, has led to almost perfect homogenization of what is chosen. In the United States, air-conditioning has now made the established lightweight tract-developers' house habitable throughout the nation, and since this is the house that the U.S. building industry is geared to produce above all others, it is now endemic from Maine to California. . . ."

Proponents of the Internet hold out the vision of infinite variety in ideas. To which we say: Not in this life. As in suburbia, so online. On the web, the people's choice in financial information turns out to be a kind of intellectual tract house. A telling case of web-borne homogeneity is

the ubiquitous online "company snapshot." You might suppose, reflects Lawrence Sterne, CEO of Wall Street Research Net, that the Internet would have evolved a corporate financial summary superior to that in the old S&P ring binders. It hasn't. Furthermore, he notes, everybody tends to have the same snapshot: "You've got to have it because everybody else has it." It's not that there is no unique online financial content, Sterne goes on. The problem is that what there is is so narrowly distributed.

We leave it up to the readers of *Grant's* to decide for themselves how much of the experience of managing money is emotional and how much is

analytical (the emotional content is not more than 90%, in our experience). And the Internet has become the superhighway of speculative emotion. What a digitally enhanced bear market will look like we may all worry about or pine for. Certainly, the digitally enhanced bull market has been one for the record books. Speaking of his extensive experiences online, William A. Fleckenstein, professional money manager and columnist on the Silicon Investor website, observes, "There is a fundamental belief that information is knowledge. It isn't."

All in all this summer, we'll take air conditioning.



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