How the Lincoln Institute Helped Bring Property Taxes into the Computer Age

IN THE EARLY 1970s, the property tax was one of America's favorite villains. Homeowners had seen their tax bills soar to new heights. Stories of corrupt assessors filled the news. And policy makers across the spectrum concluded that local governments were maladministering the property tax at the expense of the residents they were supposed to serve.

In his 1972 State of the Union address, President Richard Nixon called the property tax "oppressive and discriminatory." In the presidential election that year, all the major candidates addressed the property tax during their campaigns. After the election, Senator Edmund Muskie of Maine, who had been defeated in the Democratic primary, commissioned a detailed investigation of state and local property taxes.

"The perpetuation of archaic, unfair—and too often secretive—systems of property taxation undermines the credibility of government at all levels," Muskie said at a Senate hearing in 1973, shortly after the study was complete. "It is a national outrage that in an age of computer technology, most governments fail to administer property taxes fairly."

Over the course of the next decade, the technology Muskie had alluded to evolved dramatically. Major advances in computing power, along with the emergence of a generation of well-trained, tech-savvy assessors who could harness it, revolutionized one of the most bedeviling aspects of the property tax: determining the market value of every property. At the center of this revolution was a small organization that had been established in 1974 in Cambridge, Massachusetts, to study and teach land policy.

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As much an art as a science, the assessment of real estate values—also known as valuation, or appraisal—has been a challenge of the property tax for centuries. In 17th-century England, government officials conducted assessments by counting the hearths and stoves in each home. Later, a tax on every window was intended to function in much the same way, but it spurred people to board up windows or build houses with fewer of them. Parliament repealed the tax in 1851.
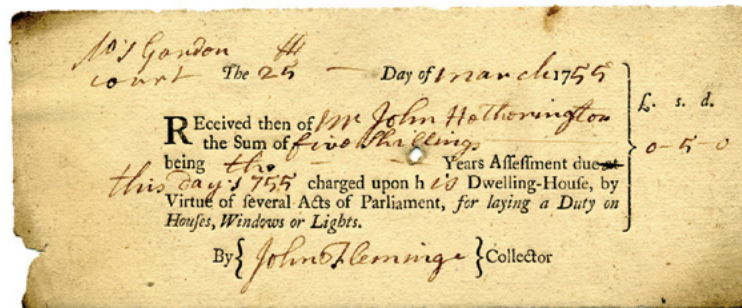
Receipt for a tax on windows in an English dwelling, 1755. Credit: The National Archives/UK.

By the early 20th century, assessors typically used one of three basic methods of determining a property's value, all of which are still in use today. The first compares each property to recently sold properties nearby. The second looks at the income the owner could receive by leasing the property. And the third estimates the cost, in labor and materials, of rebuilding a given structure, plus the value of the underlying land.

The third method, known as the "cost approach," was widely adopted in the 1920s and 1930s. To calculate the value of the land, assessors relied on the price of recently sold vacant parcels in the same area. These were common in rural areas or new suburbs, but rare in established cities.

"Land value sales are like hen's teeth—you can hardly find them," said Jerry German, who became an assessor in Cleveland, Ohio, in 1974, when many calculations were still done manually. "You'd lay the map of the jurisdiction on the floor or some giant table. Appraisers would look at the map and say, 'It appears in this area, land is going for about a dollar per square foot.' . . . I can remember our senior appraisers walking around with little slide rules in their pocket to do calculations."

What all three valuation methods had in common is that assessors made individual calculations for every property and recorded them by hand on property record cards, which were often stored in long rows of filing cabinets. The process was vulnerable to errors, inconsistencies, and corruption, with little transparency as to who decided each property's value, how the calculation was made, or who else might have influenced the decision.

By the time German arrived in Cleveland, a handful of cities had been quietly laying the groundwork for computerized assessment for more than a decade. During the 1960s, advances in computer technology collided with new data requirements, as many states mandated the accurate disclosure of real estate sale prices for the first time. Assessors used the data to identify the characteristics of a property that influenced its price, such as square footage, the number of bathrooms, and location. Large jurisdictions that could afford early computers—and consultants with the special expertise to program them—could now calculate property values automatically. The new practice, Computer Assisted Mass Appraisal (CAMA), represented a leap forward, but it also had serious drawbacks.

"The worst thing for the assessor, aside from the expense, was the inflexibility of it," German said. "Everything was hard-coded in there, and once you . . . set your path and programmed everything in, it was hell and high water to get anything changed."

A property tax assessor on the ground in Connecticut, 1972. Credit: Ralph Morse/The LIFE Picture Collection via Getty Images.

When the Lincoln Institute of Land Policy was founded as a school in 1974, its first executive director, Arlo Woolery, saw an opportunity. One of the organization's priorities was promoting a well-functioning property tax. By helping assessors computerize their work, the Lincoln Institute could provide the kind of support that had the potential to change local practices.

The Lincoln Institute held its first Colloquium on Computer Assisted Mass Appraisal in 1975. Only a handful of the roughly 13,500 assessing jurisdictions in the United States used computers to conduct mass appraisals then—"probably no more than 400 and possibly fewer than 200 jurisdictions," the appraisal expert Richard Almy estimated in a paper prepared for the colloquium. The Lincoln Institute's director of education, Charles Cook, who had worked previously for a private mass appraisal firm, began to convene and train assessors in an initiative to improve computerized appraisal and expand its use.

Recognizing that the cost and inflexibility of assessing software put it out of reach for most cities and towns, the Lincoln Institute developed software in the early 1980s called SOLIR (Small On-Line Research), which assessors could use and customize themselves with an off-the-shelf Radio Shack TRS-80 computer. This represented a breakthrough. For the first time, CAMA was accessible to local assessing offices without large budgets or computer programming skills. The Lincoln Institute provided SOLIR free to assessors who took a weeklong training course, releasing regular updates to the software for several years.

The project made the Lincoln Institute feel less like a research organization and more like "a computer startup company," said Dennis Robinson, who recently retired as the Lincoln Institute's executive vice president and chief financial officer. Robinson was hired in 1982 to oversee software development and training. He remembered "a coffee-stained, dirty, wrinkled carpet. That was our computer room. There was a bank of eight or so Radio Shack computers with programmers in there working on SOLIR."

The first assessors to use the software helped to improve it by testing its limits and recommending new features. At their request, the Lincoln Institute created a module that could help determine the value of land separate from any buildings—a critical function for maintaining up-to-date assessments.

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Computerized assessment, which the Lincoln Institute helped usher in during the 1970s and 1980s, has led to a more equitable property tax system. Credit: Courtesy of Data Cloud Solutions, LLC.

By the late 1980s, private software and consulting companies were incorporating the SOLIR technology into their own products, and the Lincoln Institute stopped developing its own software. But the Lincoln Institute continued to conduct research on innovative applications of CAMA and to convene and train assessors as the technology advanced. In the 1990s, assessors began using geographic information systems (GIS) software to develop location-based property records. By integrating these records with their CAMA systems, they could, among other things, measure the effects of neighborhood features, such as schools or parks, on the value of land. "They took these tools and did very creative, sophisticated things," Robinson said.

Today, CAMA has become central to property tax systems in the United States, Canada, and Western Europe. Many governments in Eastern Europe, Latin America, Asia, and Africa have also adopted some version of the tool, in some cases using satellite imagery or aerial photography to leapfrog over the paper records that undergirded the first CAMA systems.

In China, which is preparing to institute its first property tax, local officials in the fast-growing technology hub of Shenzhen recently developed cutting-edge applications of CAMA. They pioneered a system known as GAMA, which combines GIS with CAMA to build detailed three-dimensional models that account for factors such as views and the paths of light and sound. These added considerations can create differences of up to 20 percent in the value of apartments or condominiums within the same building.

Altogether, the advances in CAMA over the past few decades created a sea change in the administration of the property tax. "Computerized assessment might seem obvious today," said Lincoln Institute Senior Fellow Joan Youngman. "But it provided the infrastructure needed to assess every property at its true market value—the underpinning of any fair and equitable property tax system." ▢

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