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C O N T E N T S

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The University of California Transportation Center, founded in 1988, facilitates research, education, and public service for the entire UC system. Activities have centered on the Berkeley, Davis, Irvine, Los Angeles, Riverside, and Santa Barbara campuses.

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Front Cover: Rome

Nonconventional Research

Transportation research used to be focused on conventional civil engineering topics. But growing cadres of researchers have been coming to transportation from fields as diverse as psychology, law, city planning, sociology, and mathematics. Having joined the inquiry, they've widened it to nonconventional topics and nonconventional approaches.

Habitual readers of ACCESS are already familiar with Donald Shoup's idea for reducing traffic congestion. He's been saying that employers should offer employees the option to choose cash instead of free parking. Shoup is an economist who became intrigued with the hidden but complex ramifications of the automobile parking system. Having doggedly examined its innards, he then invented several pricing and administrative tools for managing traffic demand by managing parking supply.

He first persuaded the California Legislature to accept his proposal for cashing out parking subsidies. He then triggered a discussion that engaged officials in the White House and Congress and led to this year's revision of the US Internal Revenue Code—a revision that accommodates the California law and permits its extension to the rest of the country. A Congressional committee now estimates that this single act will raise federal revenues by $169 million over the next ten years, even as it cleverly also raises individual employees' incomes.

The original University Centers Program has been costing the federal government only $10 million a year. Shoup's research alone will be generating revenues of nearly $17 million a year, a very decent return on the government's investment in this little education and research program. Add the returns from the many other university projects, and we'll find this program has been an enormously profitable enterprise.

Our research has always been eclectic. That's no doubt because we engage professors and students from across the academic spectrum. Yet, when he presented the keynote address at the Institute of Transportation Studies's 50th Anniversary Jubilee here last spring, Wilfred Owen took us to task for being parochially focused on conditions in the US. He reminded us that most of the world does not enjoy the ease of movement and level of accessibility that we take for granted. He then urged us to do more for transportation in the rest of the world, especially in developing counties handicapped by extreme poverty. We're reprinting his lecture here, hoping colleagues will read his indictment and heed his mandate.

Many of us are striving to understand the critical roles that transportation plays in development and in the affairs of nations. As with parking, most Americans are so well-served by transportation systems that we accept them as unthinkingly as we accept gravity and the air we breathe—as facts-of-life, as in the nature of things. It's typically only when the systems perform poorly that citizens become aware of transportation and demand something be done about it.

Like gravity and air, transportation silently surrounds us, always here, and absolutely critical to the course of the economy, our lives, and our welfare. Foods get moved around the world daily and delivered to the local grocery, on time. People are traveling from anywhere to everywhere, in growing numbers and with increasing frequency.

Manufacturing is currently in the midst of a genuine revolution, fueled by innovations that merge transportation and communication into an integrated system that's hiking productivity throughout the global economy. Companies around the world are becoming specialized economic partners. Although spatially dispersed, they've become interlocked makers of components that must get assembled somewhere—and must arrive exactly on time. Transportation is essential to all those industrial and commercial processes and, indeed, to the fundamental workings of modern society. In many places it remains comparatively primitive, however.

Wilfred Owen's many books report on successful innovations in developed and developing countries alike. They expose useable ideas we can learn from other nations and they from us. With these roadmaps in hand, we must now invite researchers from still other fields to join our explorations and to further broaden our research agendas beyond their currently conventional styles and scopes. We have much to learn, and much more to do.

Melvin M. Webber

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CONGRESS OKAYS CASH OUT

BY DONALD C. SHOUP

A thing which you enjoyed and used as your own for a long time, whether property or opinion, takes root in your being and cannot be torn away without your resenting the act and trying to defend yourself, however you came by it.

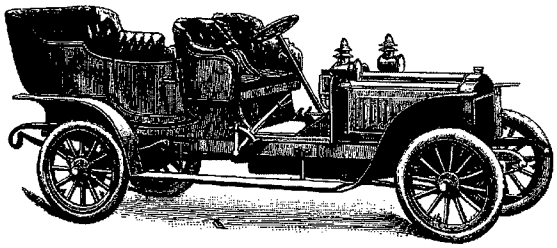
—Oliver Wendell Holmes

Chances are you drive to work alone and park free when you get there. Ninety-one percent of commuters in the United States travel to work by automobile, 92 percent of commuters' automobiles have only one occupant, and 94 percent of automobile commuters park free at work. Employers provide 85 million free parking spaces for commuters. The resulting tax-exempt parking subsidies are worth $31.5 billion a year.

Employer-paid parking is the most common tax-exempt fringe benefit in the United States. Tax exemptions are usually justified on grounds that they promote a public policy, but employer-paid parking is a matching grant for driving to work: the employer pays part of the cost of commuting by car (the parking cost) only if the employee matches it by paying the rest of the cost (the driving cost). This matching-grant arrangement encourages solo driving to work.

California's Parking Cash-Out Law

To reduce traffic congestion and air pollution, California enacted a parking cash-out law in 1992. The law requires employers who subsidize parking to give commuters the option of receiving cash instead. The cash-out requirement applies only to parking spaces that an employer rents from a third party. Therefore, if a commuter trades a parking space for cash, the money previously devoted to renting a parking space becomes the commuter's cash allowance.



Giving commuters a choice between a parking subsidy and its value in cash reveals

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that free parking has a cost—the foregone cash. Commuters who forego the cash are, in effect, spending it on parking. The cash option converts employer-paid parking from a matching grant for driving to work into an unrestricted cash grant. Employers can continue to offer free parking, but the new option to take cash instead of parking should increase the share of commuters who walk, bicycle, or ride the bus to work.

But there was a problem. Until 1998, the Internal Revenue Code imposed a tax penalty for cashing out parking subsidies. Section 132(f)(4) of the Code stated that employer-paid parking was taxable if "provided in addition to (and not in lieu of) any compensation otherwise payable to the employee." This meant that if an employer offered commuters the option to choose cash instead of free parking, the free parking became taxable income.

Suppose that, to comply with California's cash-out law, an employer offered carpoolers a cash subsidy equal to the parking subsidy they would receive if they drove to work alone. That is, suppose the employer broadened the offer from the choice between free parking and nothing to the choice between free parking and its cash value. If the employer offered this option, the free parking ceased to qualify as a tax-exempt transportation fringe benefit because it was no longer "provided in addition to (and not in lieu of) compensation otherwise payable to the employee." If an employer complied with California's cash-out law, commuters who did not cash out the free parking had to pay income tax on the formerly tax-exempt parking subsidy. This tax penalty discouraged employers from offering the cash option.

The not-in-lieu-of-compensation provision makes sense for fringe benefits that promote public purposes. For example, disallowing the choice between a pension contribution and cash compensation makes sense because pension contributions increase retirement income, which is desirable. But disallowing the choice between free parking and cash compensation does not make sense because free parking increases traffic congestion and air pollution, which are undesirable.

Cashing Out Does Reduce Traffic

In 1998, the Transportation Equity Act for the 21st Century (TEA-21) eliminated the not-in-lieu-of-compensation provision for transportation fringe benefits. As a result, employers can now offer commuters the option to choose taxable cash instead of tax-exempt parking, transit or vanpool subsidies. This minor amendment to the tax code will have major consequences for transportation and air quality. Employers in California have greater incentive to ➢

THE TAX STATUTE

BEFORE

Until it was changed in 1998, the Internal Revenue Code prohibited employers from offering taxable compensation in lieu of a tax-exempt transportation fringe benefit. Section 132(f)(4) said:

> *BENEFIT NOT IN LIEU OF COMPENSATION—[Tax exemption] shall not apply to any qualified transportation fringe unless such benefit is provided in addition to (and not in lieu of) any compensation otherwise payable to the employee.*

This meant that if an employer offered commuters cash in lieu of a parking subsidy, the parking subsidy lost its tax-exempt status.

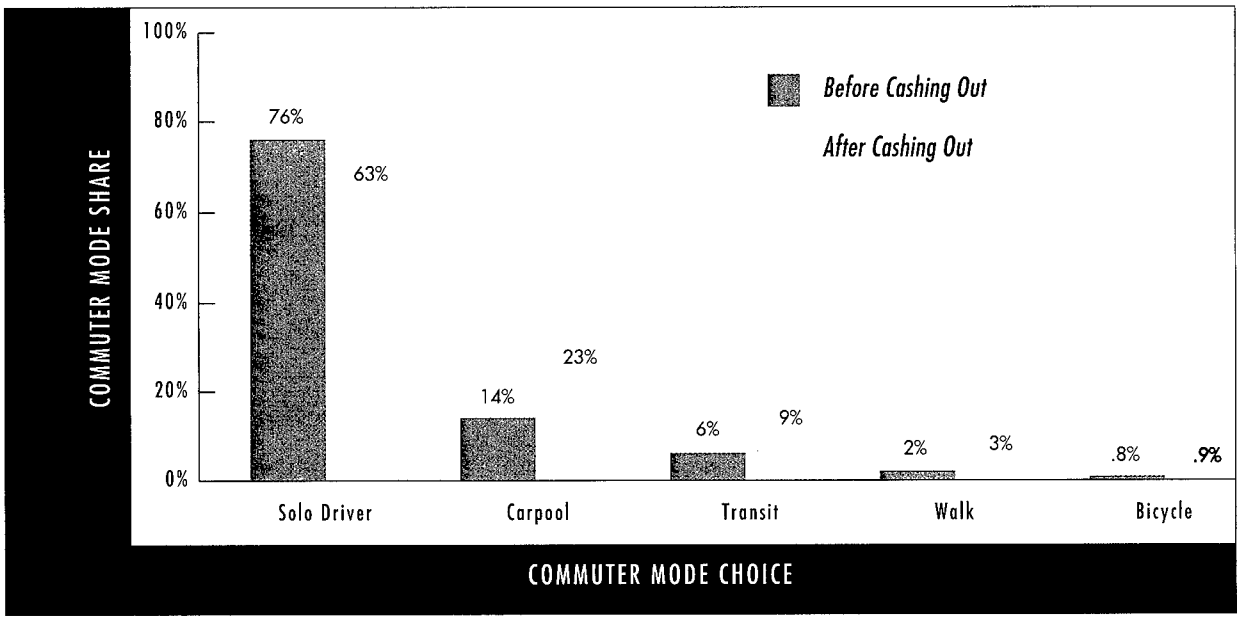
AFTER

In 1998, the Transportation Equity Act for the 21st Century amended the Internal Revenue Code to let employers offer taxable compensation in lieu of a tax-exempt transportation fringe benefit—exactly the opposite of what it formerly said. Section 132(f)(4) now says:

> *NO CONSTRUCTIVE RECEIPT—No amount shall be included in the gross income of an employee solely because the employee may choose between any qualified transportation fringe and compensation which would otherwise be includible in gross income of such employee.*

Now employers can offer commuters the option of taxable cash instead of tax-exempt subsidies for parking, transit, or vanpool. The amendment also increases the tax exemption for employer-paid transit and vanpool subsidies to $100 a month, but delays the effective date of the increase until 2002.

COMMUTER MODE SHARES:
Before and After Cashing Out (based on 1,694 employees of eight case-study firms)



comply with the state's cash-out law, and employers throughout the nation can finance a broad array of commuter travel choices with the same money they now spend to subsidize parking.

Cashing out employer-paid parking reduces traffic congestion and air pollution. Case studies of eight firms that have already complied with California's cash-out law found that solo driving to work fell by 17 percent after cashing out. The solo-driver share for commuting to the eight firms fell from 76 percent before the cash offer to 63 percent afterward. For every 100 commuters offered the cash option, thirteen solo drivers shifted to another travel mode. Of these thirteen former solo drivers, nine joined carpools, three began to ride transit, and one began to walk or bicycle to work. Because of these shifts, vehicle-miles traveled and vehicle emissions for commuting to the eight firms fell by 12 percent.

The large shifts from solo driving to ridesharing came at almost no cost to employers. The cash payments are a more flexible use of funds previously dedicated to subsidizing parking. The eight firms, considered together, reduced their parking subsidies by almost as much as they increased their cash payments in lieu of parking subsidies. The average commuting subsidy per employee rose from $72 to $74 a month, or by only 3 percent.

Beyond reducing traffic congestion and air pollution, cashing out employer-paid parking will also increase tax revenues without increasing tax rates. Suppose an employer pays $100 per space per month to provide free parking. A commuter in the 25-percent marginal tax bracket who chooses a taxable $100 payment instead of the free parking will receive $75 after tax. The $25 in added tax revenue results from voluntary

action: a commuter chooses $75 in after-tax cash rather than a parking space that costs $100 to provide. This revenue windfall comes from reducing the inefficiency that occurs when, faced with the typical choice between free parking and nothing, commuters take parking spaces they value at less than what the employer pays to provide them.

In the eight case studies of firms that offer parking cash out, employees' taxable wages increased by $255 per year per employee offered the cash option. The federal government assumes a 19-percent marginal tax rate to calculate the effects of changes in taxable wage income, and California assumes a 6.5-percent marginal tax rate. At these tax rates, federal income tax revenues increased by $48 per employee per year, and California income tax revenues increased by $17 per employee per year. Therefore, federal and state tax revenues increased by $65 per year per employee offered the cash option.

Cashing Into Tax-exempt Parking

The Internal Revenue Code amendment allows commuters to cash out tax-exempt parking—and also allows other commuters to cash *into* tax-exempt parking. Without increasing employees' total compensation, employers who do *not* subsidize parking can now offer tax-exempt parking to commuters who agree to accept a compensating reduction in their taxable wages. Because tax-exempt parking can be offered in lieu of taxable cash income, commuters can pay for parking at work with pre-tax income.

For example, suppose a commuter whose employer does not subsidize parking earns a salary of $4,100 a month and pays $100 a month for parking at work. The employer can now offer this commuter the option to choose either a salary of $4,100 a month *without* parking or a salary of $4,000 a month *with* parking. If the commuter takes the parking, the commuter's pre-tax income declines by $100 a month. Both the commuter and the employer save payroll taxes on the $100-a-month reduction in taxable wages, and the commuter also saves income taxes on the same $100 a month.

If employers adjust cash wages to compensate for differences in fringe benefits, the tax consequences are the same whether the employer or the employee pays for parking. The cash foregone by a commuter who parks at work will be the same whether or not the employer offers "free" parking. A commuter who earns $4,000 a month *with* ➢

CASHING OUT AND CASHING IN:

Monthly Compensation is Equal Either With or Without Employer-paid Parking

	Employer pays for parking (tax-exempt)	Employee pays for parking (pre-tax)
Salary	$4,000	$4,100
Parking	FREE	−$100

employer-paid parking that can be cashed out for $100 a month in taxable income receives the same compensation as a commuter who earns $4,100 a month *without* employer-paid parking and pays $100 a month (pre-tax) to park In both cases the commuter can take either $4,000 in taxable wages with a- parking space or $4,100 in taxable wages without a parking space. In both cases the commuter's cost of parking is the after-tax value of $100 a month.

This example is not merely hypothetical. The University of California has arranged for employees' payroll deductions for parking to be taken from pre-tax income, up to the tax-exempt limit of $175 a month for employer-paid parking. As an employer, the University will save an estimated $1 million a year in Social Security and Medicare payroll taxes from this arrangement. The University's employees will save an estimated $5.4 million a year in Social Security, Medicare, and federal income taxes (see Table). The tax savings per employee range from $69 a year at UC Santa Barbara to $236 a year at UCLA. The higher tax savings at UCLA reflect the higher prices for parking at UCLA.

Commuter-paid parking is not automatically tax exempt. That is, commuters can pay for parking at work out of pre-tax income only if their employers allow them to take parking in exchange for a reduction in taxable income. Therefore, the tax-exemption for commuter-paid parking is due to a voluntary reduction in taxable income.

Despite the tax revenue lost when unsubsidized commuters cash into tax-exempt parking, Congress's Joint Committee on Taxation estimated that cashing out tax-exempt

PAYING FOR PARKING FROM PRE-TAX INCOME:

Estimated Tax Savings at the University of California

CAMPUS	EMPLOYEES WHO PAY FOR PARKING	TOTAL ANNUAL PARKING FEES ($)	TOTAL ANNUAL TAX SAVINGS ($)	ANNUAL TAX SAVINGS PER EMPLOYEE ($)
Berkeley	3,719	2,028,000	652,106	175
Davis	8,692	3,403,944	1,130,888	130
Irvine	4,875	1,019,088	341,984	70
Los Angeles	11,384	8,473,700	2,686,504	236
Riverside	1,923	456,617	146,101	76
San Diego	4,569	2,324,496	752,418	165
San Francisco	1,755	1,265,106	362,641	207
Santa Barbara	2,559	517,993	175,992	69
Santa Cruz	1,628	415,193	141,085	87
Total	**41,104**	**19,904,137**	**6,389,719**	**Avg. 155**

Source: University of California Payroll and Tax Services, June 4, 1998
The University's tax savings are from payroll taxes. Employees' tax savings are from both payroll taxes and income taxes.

parking *and* cashing into it will increase federal income tax and Social Security tax revenues by $169 million between 1998 and 2007. This estimated *net* revenue windfall for the federal government is (1) the *increase* in tax revenue from commuters who cash out their tax-exempt parking and pay taxes on the cash, minus (2) the *decrease* in tax revenue from commuters who cash into tax-exempt parking and avoid taxes on the parking. The $169 million increase in federal tax revenue is the *net* change from all commuters who make a trade between tax-exempt parking and taxable cash, in either direction. Because many more commuters can cash out of tax-exempt parking than can cash into it, the federal government gains more tax revenue than it loses.

The reduced after-tax price of parking for those who do not already park free at work will presumably induce some commuters to begin driving to work. But 91 percent of commuters drive to work, and 94 percent of automobile commuters park free at work, so relatively few commuters can begin driving to work. For these commuters, paying for parking with pre-tax income reduces the price of parking by the commuter's marginal tax rate. In comparison, the option to cash out free parking will increase the opportunity cost of taking the parking from nothing to the after-tax value of the parking subsidy. Therefore, the option to cash in will reduce the price of parking by 20 to 30 percent for a few commuters, and the option to cash out will increase the price of parking by 70 to 80 percent for many commuters.

Equity

Cashing out and cashing in will increase transportation and tax equity in three ways. First, cashing out will improve equity among commuters who are offered free parking. Without the cash option, free parking provides no benefit to commuters who walk, ride their bikes, or take transit to work. With the cash option, employers can easily offer the same transportation benefit to all commuters. ➢

CASHING INTO TAX-EXEMPT TRANSIT AND VANPOOLS

The tax exemption for employer-paid transportation fringe benefits includes not only parking subsidies, but also transit and vanpool subsidies. Because the not-in-lieu-of-compensation provision was eliminated for *all* transportation fringe benefits, commuters can now cash *into* tax-exempt transit and vanpool subsidies in the same way that they can cash *into* tax-exempt parking. The tax exemption for employer-paid transit and vanpool fringe benefits is $65 a month in 1998, and TEA-21 schedules this exemption to jump to $100 a month in 2002.

Second, cashing out and cashing in will improve equity between commuters who park free and commuters who pay to park. If commuters who park free can cash out, and commuters who pay to park can cash in, everyone can pay for parking with pre-tax income. The opportunity cost of taking a parking space at work will be the same whether or not the employer subsidizes parking.

Third, cashing in will enable many transit and vanpool commuters to pay their commuting expenses with pre-tax income. Most automobile commuters now receive tax-exempt free parking while most transit and vanpool commuters pay with taxable income. Pre-tax payment for transit and vanpools can remove the inequity.

Conclusion

The tax exemption for employer-paid parking is an anomaly among tax-exempt fringe benefits because it stimulates behavior that other public policies are designed to discourage—solo driving to work. TEA-21 amended the Internal Revenue Code to give commuters the option to choose cash in lieu of any parking subsidy offered. The amendment allows the 94 percent of commuters who park free at work to cash out their employer-paid parking subsidies. The amendment also benefits a small group of people the tax code had previously discriminated against because the 6 percent of automobile commuters who pay for parking can now pay with pre-tax income. Transit and vanpool commuters can also pay their commuting cost with pre-tax income.

The tax code continues to favor solo driving to work because parking subsidies remain tax exempt and cash is taxable. Therefore, allowing commuters to take taxable cash in lieu of a tax-exempt parking subsidy is a small reform. But as Justice Ginsberg, quoting Justice Cardozo, recommended in her Senate confirmation hearing, "Justice is not to be taken by storm. She is to be wooed by slow advances." ◆

FURTHER READING

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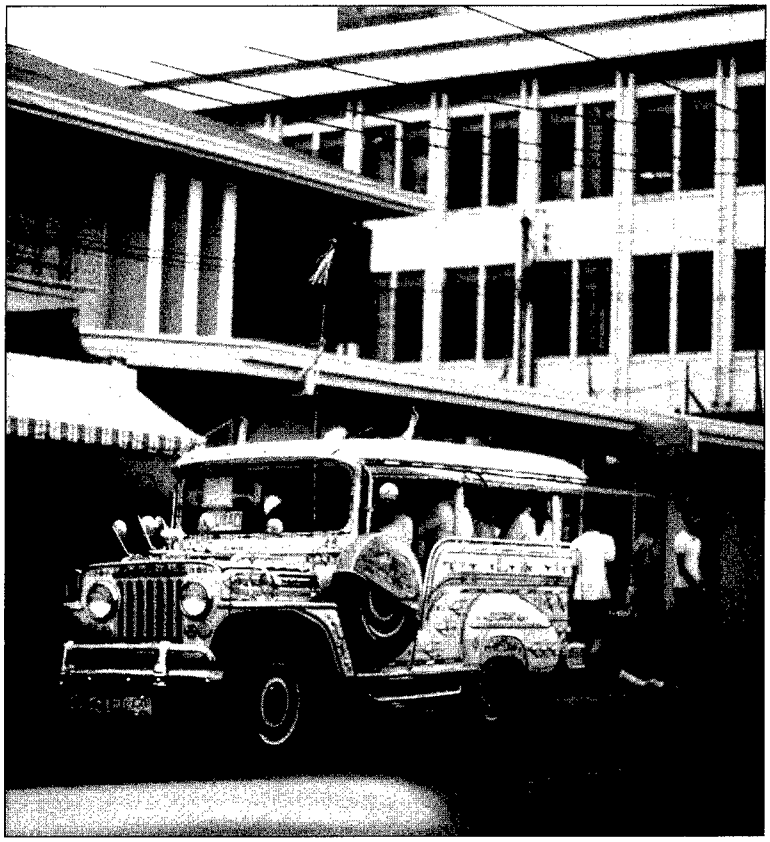


Global Transportation

BY WILFRED OWEN

The coming millennium will be a time to look back and to look ahead. But we should also look around. We share a planet whose societies have become closely interdependent but grossly unequal. A small minority are mobile and affluent while the majority are immobile and destitute. ➢

Wilfred Owen is a former Senior Fellow at the Brookings Institution. He presented this essay as the keynote address at the 50th Anniversary Jubilee of the Institute of Transportation Studies, University of California, Berkeley, April 1998 (owenarl@aol.com).

There are forty-nine countries classified by the World Bank as low income. These are home to more than three billion people, over half of earth's population. Their income per capita averages about a dollar a day. Americans have average incomes eighty times higher. The poor countries suffer an enormous backlog of needs—from food and shelter to health care, schools, and all conceivable goods and services. In a global economy there is growing pressure to alleviate these conditions, in part for humanitarian reasons and in part because continuing global prosperity is contingent on the very large volume of trade with developing countries and on the foreign investment opportunities they provide.

Without effective transportation and access to jobs and resources, poor countries cannot provide for their own basic needs, much less contribute their share of world production; and they cannot help prepare for the additional two billion people coming before 2025. Insufficient transportation may ultimately lead to critical shortages and skyrocketing prices that can threaten growing prosperity and world peace.

While poor countries have the most dramatic transport difficulties, our country has its share of problems too. After years of advances in mobility, some negative trends are appearing. The general quality of transportation is declining, with traffic congestion, parking shortages, and ever-increasing pollution eroding the vitality of cities and threatening efficient operation of both passenger and freight systems.

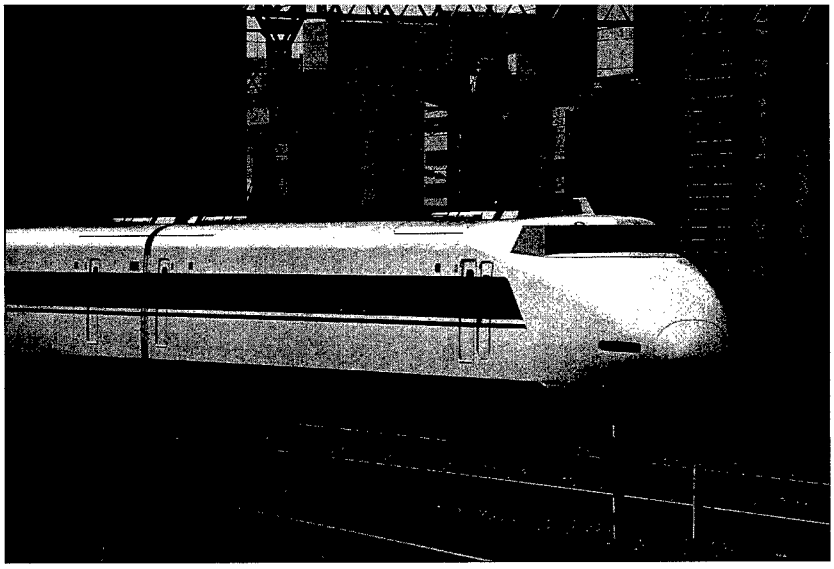
These conditions, affecting both rich and poor nations, show that transportation problems are universal. People in most countries complain of traffic congestion, air and noise pollution, poor public transport, inadequate maintenance, high accident rates, insufficient funds, and the disappearance of open space. Thus there probably are a few common causes and, in turn, some generally applicable remedies. To identify such commonalities, we must launch a major program of comparative international studies.

Systems

We view transportation much too narrowly. It's not just a way to move people and freight around. It's basically a way to achieve the goals of society—whether the goals are growing food, commuting to work, expanding production and trade, building better cities, creating jobs, or reducing poverty.

A systems approach would expose ways of increasing mobility while also revealing ways of reducing the need for moving. We transportation professionals should be addressing transportation as a means for achieving larger goals, rather than as an end in itself.

Widespread resistance to confronting whole transport systems keeps us from treating transportation as a component of the larger societal system. Instead we focus on individual projects, single modes, local plans, and competition rather than cooperation. Recently we've made progress in the organization and operation of intermodal freight systems, reflecting the dramatic technological developments in containers, computers, and telecommunications. Real-time coordination of road, rail, sea, and air carriers is increasing awareness of transport systems' global reach and of the intricate functional interdependencies that make these systems such powerful agents of economic and social development. These ramifications call for systemwide solutions that affect not only ➢



transportation supply but also the policies and programs that affect transportation demand. Demand can often be reduced by improving the urban environment, by designing transport-conserving communities, or by using telecommunications to reduce the length and frequency of commuter trips.

Transportation providers pay little attention to the larger context of transportation problems—how each mode contributes to traffic in relation to other modes. To do so requires institutions equipped to build partnerships and to engage in joint ventures. While some problems call for greater mobility, others call for easier access. In turn, all require active coordination for expanding transport services, shaping land-use developments, and guiding investment in new industrial and commercial enterprises.

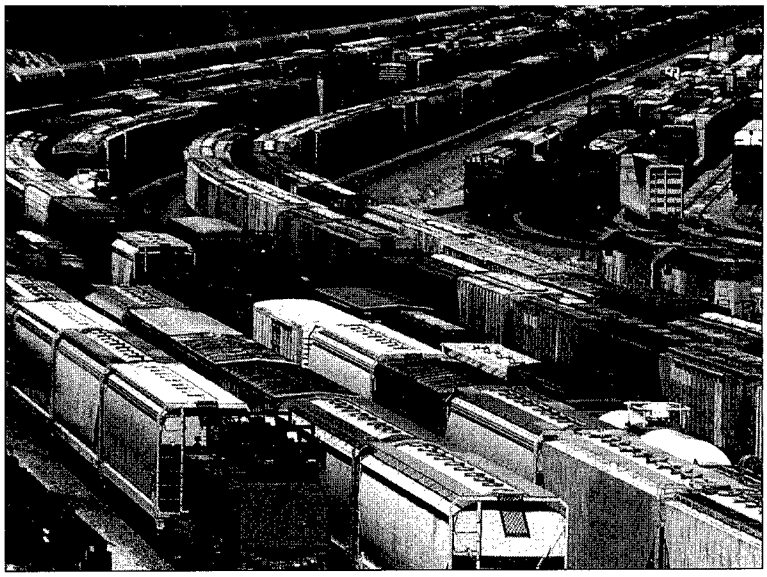
Limitations of available resources, both material and fiscal, call for prudent management. Transportation resources can be conserved by more efficiently using what we already have. Just as water supplies are being stretched by cleaning distribution channels rather than by tapping new sources, more use can be derived from existing travelways. Electric power companies are giving away energy-efficient equipment, knowing that a given amount spent on conservation can produce more energy than the same investment in additional generating plants. Improved management of travel demand promises similar returns in the transport sectors.

Urban Livability

America's inner cities and cities in the developing world may find relevant ideas in efforts around the world to view transportation as an integral means to improve human conditions. As an example, consider Singapore, a formerly poor country that overcame many obstacles and emerged as one of the world's richest nations.

In 1960 Singapore confronted its intense traffic problems in the larger context of supplying housing, jobs, and income security for its people. It launched a massive program of urban redevelopment and simultaneously created new planned communities on the outskirts to accommodate industrial and population growth.

Transportation became one of several means for moving out of wretched living conditions and into decent urban settings. Through redesign and relocation, old city ➢



slums were transformed by scenic boulevards, waterfront parkways, and allocation of space for housing and industrial estates, parks, schools, and various urban amenities.

A tiny island nation may not be the first model one would turn to for an American city, but Singapore's unique experience nevertheless demonstrates how transportation can provide a means for achieving a society's goals. The goals in this case were economic and human development; the means were jobs, education and training, modern housing, and the creation of transportation services and city-building industries that, in turn, would help to fuel further economic development.

Congestion everywhere has reached a destructive level that demands better use of transportation and communication—not to increase concentration, but to disperse the population in an orderly manner and to stop random spillover into the surrounding countryside.

Most urban planning efforts have centered on monumental capitals and government headquarters or on communities designed mainly for upper-income residents. Plans do not yet adequately address the needs of lower-income groups.

There's a wealth of material for international case studies of moderate-income planned communities, such as Tama and Senri in Japan, Tema in Ghana, and the Fifteenth of July, a new town outside Cairo. Data about these places await the comparative case studies that will help us understand the details of how transportation and communication can foster livable and transportation-friendly communities. As we face the imminent explosion of urban populations, an international commitment to institutional, financial, and managerial assistance can spell the difference between a prosperous and a desolate urban future.

Communications

Research on the substitution of telecommunications for transportation suggests a high payoff. The first information highways emerged in the United States 100 years ago with the mail system. After Congress authorized the Rural Free Delivery System, farmers agreed to clear the roads for all-weather mail delivery in order to be included in the RFD system. It turned out that access to magazines, letters, and other sources of ➢

information became a greater stimulus to development than the availability of transportation alone.

The effects of communication with the outside world were also apparent when the first telephones came to villages in India a few years ago. While the decades-old dusty roads led to no awakening, the new communications marked a significant increase in economic activity, political and social intercourse, rising bank deposits, and greater ability to finance still further transport improvements.

With the introduction of low, earth-orbiting satellites, highways are secondary to skyways in bringing modern technology to low-income areas. Already, telecommunication-service centers offer new options to farmers and businesses, allowing those unable to afford such hardware to send e-mail or faxes, or to rent a web page and advertise their products throughout the world. Telecommunications, in conjunction with transport improvements, can lead the way to economic development and support of the resulting trade and travel.

International Cooperation

Nature itself seems to encourage global interaction. The world is equipped with built-in transportation channels available free of charge whenever humans learn to take advantage of them. The oceans support great bulk-cargo carriers and container ships that interconnect the continents. Aircraft carry people and goods on airways that have no need for construction or maintenance. Information and a host of services are delivered electronically through the atmosphere, and the floor of the sea provides the rights-of-way for thousands of miles of fiber-optic cables.

But nature provided no such gifts for transportation on land. Land transport was left to humans; and, while roads and rails have increased mobility and access in wealthy places, the cost of building and maintaining such infrastructure remains a burden in less-developed areas. Despite international aid, poor countries may have so much debt that annual charges for interest and repayment are eating into foreign exchange reserves and slowing current development programs. In some years, rich countries get more money from poor countries than the poor get from the rich.

Aided countries also have difficulty maintaining the infrastructure financed on their behalf. Without funds for upkeep, hundreds of miles of roads fall into disrepair or disappear altogether. Machinery without spare parts rusts in the fields. Low-income nations

need not only capital but continuing help in management and operation. Moreover, they need lasting international public-private partnerships.

Successful international partnerships are being established in the telephone and telecommunication sectors and, more recently, in the supply and distribution of energy. In transportation the public-private partnerships created to supply international air-cargo services need to be extended. More airports and highways are required to facilitate much wider networks connecting selected growth points and creating a worldwide production and marketing system.

In an era when services of all kinds cross national borders, it is time to create a global transportation system. Much of the leadership in designing and building integrated networks of transport channels will undoubtedly arise out of the transport industries themselves. Nevertheless, the transportation professions can provide the concepts and the analyses that come first. Comparative international studies are essential, if we are to attain global mobility.

So I urge the University of California and all the other transportation research centers to launch concerted programs of international studies—investigations into the potential roles of transport in developmental processes. Because transportation plays such critical roles in development, we who work in this field have a special responsibility to increase the payoffs from transport investments. Above all, we must seek to assure that the payoffs redound to the places and people that need them most. ◆

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Taxing Foreigners Living Abroad

BY DAVID LEVINSON

"To improve the British economy, I'd tax all foreigners living abroad."
—Man in Bowler Hat from *Monty Python's Flying Circus*

Will toll roads ever become the norm, leaving "free" roads a distant memory? Now that new electronic toll-collection systems can collect fees from vehicles traveling at full speed, we must ask whether they inevitably will. People who believe technological developments compel institutional changes expect tolls will replace taxes in transportation finance. Those who believe institutional arrangements are independent of technological changes are dubious.

Recent articles in ACCESS have explored some of these prospects. Kenneth Small maintains new technologies will encourage tolls, including tolls that vary by time-of-day and by volumes-of-traffic—congestion prices. Klein and Fielding suggest that, by allowing single-occupant cars to save time by using relatively uncongested high-occupancy vehicle (HOV) lanes for a fee, lane-by-lane we could convert HOV lanes into high-occupancy toll (HOT) lanes. In contrast, Wachs argues that "the prospects for widespread adoption of congestion pricing are extremely limited" because only a small political constituency (principally transportation economists and planners) favors such pricing.

The debate revolves around three separate, but related, proposals: converting existing fixed tolls into time-varying tolls, building new toll lanes and roads, and charging tolls on currently "free" roads, including converting HOV lanes into HOT lanes.

Many different services already have prices that vary by time-of-day, including telephones (cheaper evening and weekend rates), movie theaters (the matinee show), and restaurants (the early bird special). Giving discounts to travelers during the uncongested off-peak hours should attract less opposition than an extra toll on peak-period travelers. Setting the right tolls, so that time-of-day pricing is efficient without being too complex, is a challenging but surmountable problem.

New or widened roads can be financed either from tolls or from general revenue sources such as gas taxes. With completion of the Interstate system, localities must bear a greater share of new highway costs. But along with greater financial responsibility comes increased flexibility. While the federal government prohibited tolls on newly constructed Interstate highways, no such prohibition exists on locally funded roads. Besides producing otherwise unavailable funds, toll financing ties use closely to payment, and thus sends influential signals to drivers about whether to drive or not.

The toll roads that America use today have never been "free," and so they've never faced the politically contentious problem of conversion. The success of converting free roads to tolls depends in part on how government spends the new toll revenue. Furthermore, while tolling may seem strange and new in a California that championed the *freeway,* it is one idea that moved from the East Coast westward.

Of course, just as there is no free lunch, there is no free way. The real issues are the directness of the charge and who pays it. Directness depends on whether government collects ➢

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payments on each road segment, for every trip, at every fill-up of the gas tank, or once a year as a tax. Different individuals may pay more or less than their fair share. We call those who pay nothing for the use of the road "free riders." Though the ride may be free to them, it costs someone else. So while there is no free way, some may take a free ride.

RIDING FREE AND TAXING THE OTHER GUY

States in the East continue to finance many highways with tolls, but Westerners do not. Clearly there are historical and political reasons for that, but underlying the history is a set of preferences that shape each state's decision. In brief, preferences can be summed up by the folk aphorism, "Don't tax you, don't tax me, tax the fellow behind the tree."

Local governments typically rely on a mix of revenue sources, each borne by a different set of people. For instance, taxes on car rentals, hotels, and entertainment are common in tourist areas. Speed traps adjoin major highways passing through small towns. Many conventional taxes cannot reach nonresidents who don't have to pay local income, property, or sales taxes; but road tolls can. And the proportion of nonresidents using roads in physically smaller eastern states, or tourist areas like Florida, is greater than in the West.

If a state places a tollbooth near the state line (referred to as a *boundary toll*), it expects that at least half the tolls are paid by nonresidents. The proportion of tolls paid by nonresidents is higher than the share of total vehicle miles they travel. To understand the choice between taxes and tolls for highway finance, one must ask who gets to use roads without paying the full cost. In large localities employing boundary tolls, ever-more trips stay inside the boundary and thus do not pay tolls. However, under tax financing, the larger the community, the greater the share of travelers who do pay taxes. A tax-based financing system, particularly in a small jurisdiction, is inequitable to local residents—and may not be politically stable. On the other hand, a toll-based system is

TABLE 1

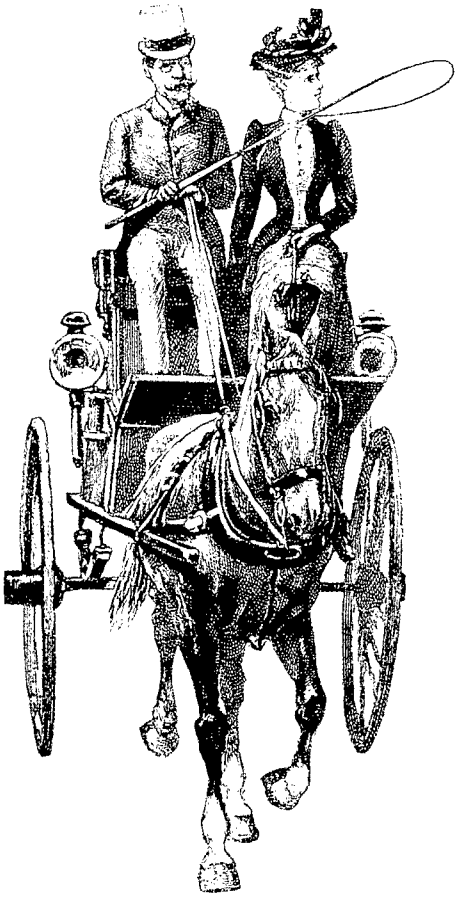
Who Pays?

	RESIDENTS	NONRESIDENTS
TAX	Payment Greater Than Fair Share	No Payment for Use of Road (Free Ride)
TOLL	Payment Less Than Fair Share	Payment Greater Than Fair Share

unfair to nonresidents, and therefore sidesteps the political problems.

Table 1 illustrates that taxes, particularly property or income taxes, but even gas taxes when drivers buy their gas near home, fall disproportionately or entirely on local residents, while nonresidents ride for free. Many tolls, particularly boundary tolls, fall hardest on nonresidents, while residents get off easy.

My research reveals many reasons for localities to choose taxes or tolls of various kinds. I find that small political units have a greater motive to impose tolls than do large ones. The smaller the community, the greater the share of toll revenue from nonresidents. For large regions, tolls collected at the state or county line may prove insufficient to recover costs. However under the right circumstances, boundary tolls enable a jurisdiction to achieve the locally ideal policy of "taxing foreigners living abroad."



HISTORICAL EVIDENCE

The first significant wave of turnpikes lasted from the 1700s and peaked in the early-to-mid 1800s. This era saw turnpikes under the control of local companies and trusts chartered by states (in the United States) or Parliament (in the United Kingdom). Before turnpike deployment, rural residents maintained roads often used by urban dwellers for intercity travel. Maintenance took the form of statute labor, the requirement to participate several days a year in a road gang that ensured the road was relatively smooth and properly graded. The wealthy could buy their way out of statute labor, an early form of road tax. Under the statute labor system, nonresidents neither paid local taxes nor worked to maintain local roads, and thus would act as free riders. With tolls, local residents often received discounts or paid one-time charges for using the roads.

Another significant wave of toll financing arrived with the arrival of grade-separated highways. As vehicles and highways improved, both travel speeds and trip lengths increased, as did trips between states. The divergence between taxpayers and road users led to the re-emergence of the free-rider problem. Since financing was at the state level, turnpikes were effective for collecting revenue from all users and mitigating the potential free-rider problem. Furthermore, unlike earlier roads, grade-separated roads can easily exclude nonpayers. Tolls can be cost-effectively assessed at each of the limited number of entrances, unlike roads without grade separation. But when federal financing became dominant with the 1956 Interstate Highway Act, the definition of "local" changed to include everyone in the nation. Congress preferred the revenue medium with lower collection costs (namely the gas tax) to tolls, especially since the goal was simply cost-recovery rather than profit. As a result, few new toll roads were constructed in the US during the Interstate era. ➢

ANALYZING REVENUE CHOICE

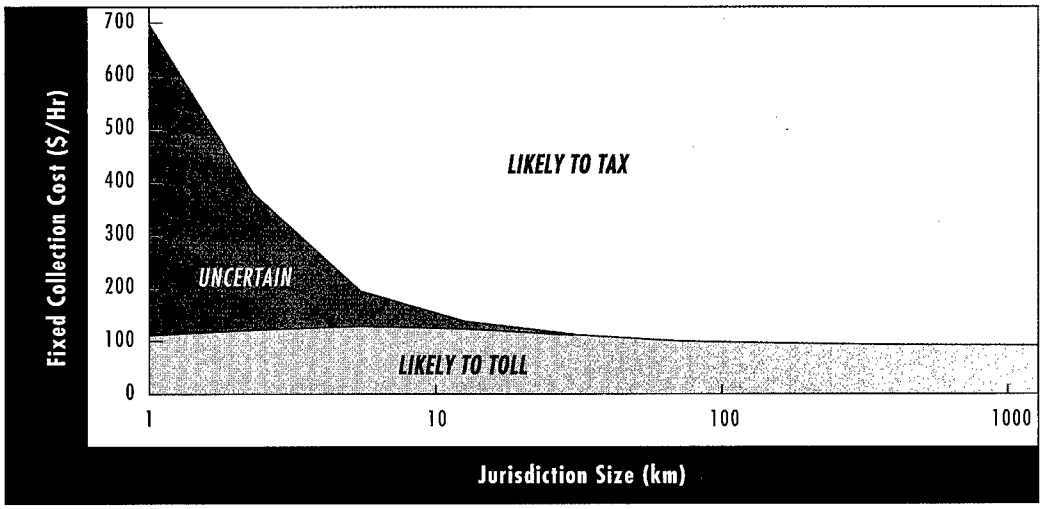
The likelihood that government will use tolls depends on whether local, state, or federal government controls the road network in a given area. It matters whether there is local control and multiple jurisdictions (for instance, different states) or a single central authority (such as the federal government) reigning over the road network. I assume that each locale acts to maximize benefits to its residents—a calculus I call *local welfare.* This measure explicitly excludes any benefits to nonresidents. Each community selects a revenue instrument (such as taxes or tolls) and sets a rate of tax or toll to achieve its goal.

The interaction between multiple political units and their residents complicates the picture. Each jurisdiction's residents use both local and non-local streets, while residents and nonresidents alike use its roads. The proportion of trips on a community's roads made by residents and by nonresidents directly shapes the local welfare resulting from a particular revenue medium. This proportion depends on the size of the relevant city, county, or state. The choice between tax and toll must trade-off the number of system users who don't pay their full cost because of where they live and travel, and the costs of collection. Travelers' sensitivity to tolls limits the revenue recovered. The decision whether to impose taxes, tolls, or some combination of the two therefore depends on jurisdiction size.

Figure 1 illustrates a typical case. The horizontal axis arrays jurisdiction sizes. The vertical axis reflects the fixed costs of collecting tolls at a tollbooth ($/hour). The net result is that small states are more likely to impose tolls to attain revenue from nonresidents, particularly on through trips. Large states are more likely to impose taxes or a combination of both taxes and tolls than to rely only on boundary tolls. This is because boundary tolls raise insufficient revenues to cover costs, since revenue levels off above some point. In uncongested conditions, use of interior (nonboundary) tolls usually does little to enhance local welfare because most additional revenue raised comes from local residents.

FIGURE 1

Policy Choice Depends on Fixed Collection Costs and Jurisdiction Size



CONCLUSIONS

The original choice of the gas tax for highway finance relied upon certain underlying fundamental conditions. New trends are changing those conditions. These include increasing importance of social costs, shifts to alternative energy sources, rising congestion, scarcity of financial resources, emergence of new intelligent transportation technologies, and electronic toll collection. Further, changing priorities associated with a mature road network, from construction to maintenance, demand revisions to the existing highway finance system and its preferences for ribbon cuttings rather than repairs.

One reason jurisdictions choose tolls is to eliminate cross-subsidies between groups, particularly cross-subsidies paid by its residents for the benefit of nonresidents. The perception of cross-subsidy differs between small jurisdictions and large ones. Jurisdictions also choose tolls as a prerequisite to more efficient use of the roads, achieved through congestion pricing. One can reasonably argue that it's not nearly as difficult to vary rates, once tolls are in place, as it is to initiate tolls (varying or fixed) on untolled roads. Over time, direct road pricing can provide off-peak discounts, and can thus be converted to time-of-day pricing, which is more efficient than fixed prices.

The path for implementing road pricing has been strewn with political potholes because pricing, particularly congestion pricing, inevitably produces winners and losers. It would be naive to believe that the institutional issues will be easily overcome. It will be difficult for Washington to devolve power to the states, or the states to the metro areas, cities, and counties. Nevertheless, to implement road pricing we need an approach that creates local winners. Decentralization of authority over roads is one such strategy. ◆

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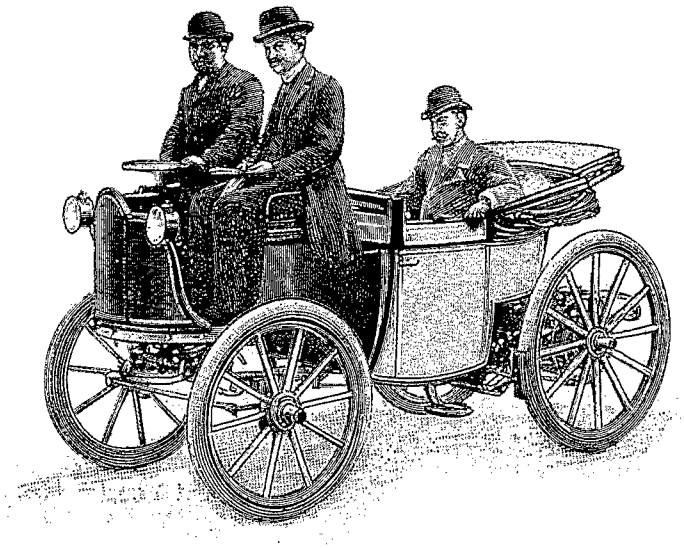
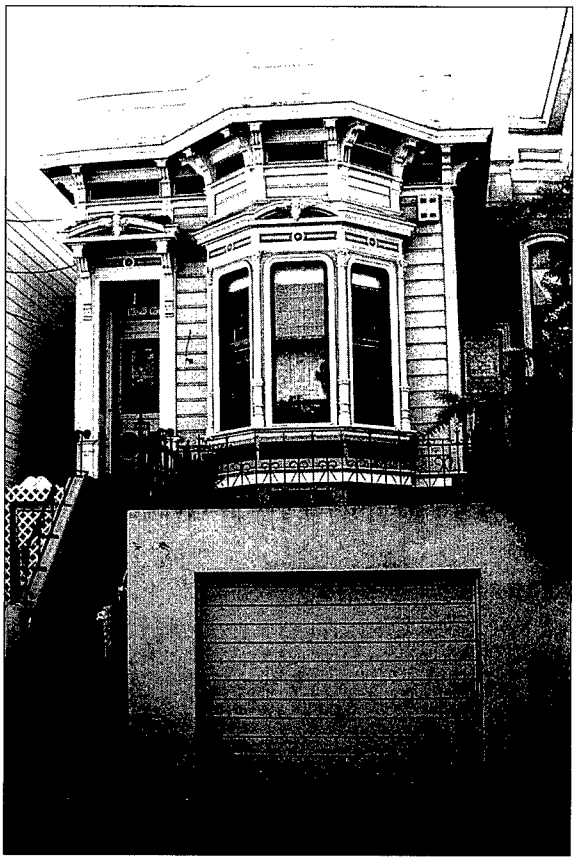


Parking and Affordable Housing

BY WENYU JIA AND MARTIN WACHS

Housing affordability and parking availability are two of the most vexing problems in the nation's largest cities. In San Francisco, internationally known for its ambience, most working people find it almost impossible to find a house, condo, or apartment at an affordable price. Finding a parking space is nearly as difficult. Many houses are situated on very narrow lots, and frequent curb cuts for driveways reduce on-street parking. Cars circle the block looking for rare empty spaces. Residents say parking problems are a major bane of urban life. In many other urban centers as well—including New York, Chicago, Boston, and Seattle—housing costs and parking availability are twin public-policy problems that become enormous when combined.



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Although Americans rarely connect housing affordability with parking availability, the two problems are actually intimately linked, presenting planners with something of a conundrum. To ease parking shortages, cities write zoning ordinances requiring that new dwelling units have off-street parking. But parking spaces add significantly to the cost of building houses, thus raising their sales prices or monthly rents. So it seems that reducing the parking problem also reduces housing affordability. If municipalities allowed new housing units to be built without parking spaces, housing prices would be lower but streets might eventually overflow with parked cars.

By providing parking spaces along with new housing, developers may be inviting more cars into the city. Planners often encourage "transit-oriented development" to increase public transit use and lessen residents' reliance on automobiles. It would seem logical to *decrease* the number of parking spaces in neighborhoods that have good transit access, as many in San Francisco do. Neighborhoods with fewer parking spaces and efficient transit service may attract families who avoid or limit car trips. But even neighborhoods with few car owners can suffer parking shortages. The double and triple parking common on Manhattan's residential streets occurs in densely populated communities where car ownership rates are comparatively low.

Should urban policies require that builders provide more parking—to alleviate parking shortages? Or should they require less parking—to promote cheaper housing and more transit use? Choosing the former may result in higher residential prices, more cars, and less transit use. Choosing the latter may lead to streets congested by parked cars.

San Francisco requires one parking space per new dwelling unit. If the housing is specifically intended for the elderly, they require fewer parking spaces, presuming the tenants will own fewer cars than younger residents. Many other cities require larger numbers of parking spaces per dwelling unit (often one parking space per bedroom). Still, San Francisco's requirement may be influencing housing affordability. Because many dwelling units were built before current parking requirements were enacted, we studied the relationship between parking and housing by comparing the sales of units that included parking spaces with those that did not. We controlled for the effects on sales prices of other variables including the units' age, size, and amenities.

RESEARCH DESIGN

We looked at six San Francisco neighborhoods with fairly typical demographics (including income, household size, racial composition): North Beach, Haight-Ashbury, Duboce Triangle, Russian Hill, Noe Valley, and the Castro District. We considered data on the units sold in 1996: address, initial asking price, selling price, number of days until sold, date sold, size in square feet, number of bedrooms and bathrooms, unit's age, architectural style, off-street parking availability, and neighborhood description. Our study geographically linked these real estate data with the 1990 census so that real estate and community demographic information could be considered simultaneously. In total we had data describing 232 dwelling units listed for sale in 1996, distributed among ➢

A typical San Francisco street front.

twenty-eight census tracts in the selected neighborhoods. A statistical technique known as a hedonic model allowed us to assess the effects of off-street parking on the sales prices of the housing units, while holding constant effects of other variables. We found that parking dramatically affects housing affordability.

THE EFFECTS OF OFF-STREET PARKING ON HOUSING COSTS

In 1996 single-family dwelling units with off-street parking sold for an average of $394,779, while units without parking sold for an average of $348,388. This price differential of 11.8 percent is statistically significant. Similarly, the average selling price of condominiums with garages was $38,804 more than condos without parking, a difference of about 13 percent. Parking availability was among the three most influential of a multitude of factors that determine selling price. Only unit size and number of bathrooms had a larger influence on prices.

These differences directly affect housing affordability. Most people seeking housing in San Francisco apply for mortgages. Assuming a prevailing rate of 7.5 percent for a thirty-year mortgage with a 10 percent down payment, an annual family income of $76,000 is required to qualify for a mortgage on the average single-family home in San Francisco neighborhoods with off-street parking. So, most lower- and middle-income families are excluded from these communities. The average annual household income needed to qualify for a mortgage on a unit without parking was $67,000. Thus, many more households could afford to live in these neighborhoods if building codes did not require parking.

Condominiums at the median sales value in these communities showed similar results. A condominium loan on a median-priced unit with off-street parking required an annual family income of $59,000. A household income of only $51,000 would support a

loan on the average condo without parking. Again, the parking requirement significantly affects housing accessibility in San Francisco.

We estimate that in the 1996 market 68,700 San Francisco households could qualify for mortgages on typical single-family units with parking, while *16,600 additional* households could afford an equivalent home without parking. Thus, 24 percent more households could afford houses if they did not include parking. Similarly, if the parking ordinance did not exist, *26,800 additional* households could afford condominiums. The number of households that could qualify for loans on condos without parking was 20 percent greater than the number that could qualify for those with off-street parking. Further, condominiums with parking took an average of forty-one days longer to sell than those without.

POLICY IMPLICATIONS

Why is the requirement for a parking space bundled with housing? In Tokyo, families cannot register automobiles until they have off-street spaces for them, but families that do not own cars need not pay for parking spaces attached to their houses. Why should each dwelling unit be required to have a fixed number of parking spaces regardless of the number of cars in the household? Would the public interest be better served if parking and housing were unbundled, creating separate markets for each? Vehicles could be parked off the street in parking garages independent of dwelling units.

Imagine American cities in which housing developers provide dwelling units and parking spaces separately. If there were separate markets for housing and parking, a buyer could opt for a housing unit with zero, one, or two parking spaces depending on need. Long-time neighborhood residents who have cars but no garages in their older dwellings would be able to purchase or lease parking spaces associated with newly constructed housing, while new residents who do not need parking would not be required to pay for a unit that includes parking.

If parking and housing were marketed separately in inner-city urban neighborhoods, wouldn't everyone choose not to pay for parking and instead park free on local streets? Not necessarily, especially if parking restrictions and time limits are strictly enforced by the local police or traffic department. Rather than searching endlessly for an on-street space or moving a car frequently to comply with parking time limits, car owners with sufficient income would probably choose to purchase or lease parking spaces. Others, wishing to save money, would give up cars they rarely use to forego a garage and pay less for housing.

A greater understanding of the relationship between housing affordability and parking requirements would inform discussion and policymaking on both issues. But, even with further studies, there will be no simple or obvious policy recommendations on the right course for each and every neighborhood. We must balance the need for affordable housing with the problem of congested streets. Different approaches may be best for different communities. ◆

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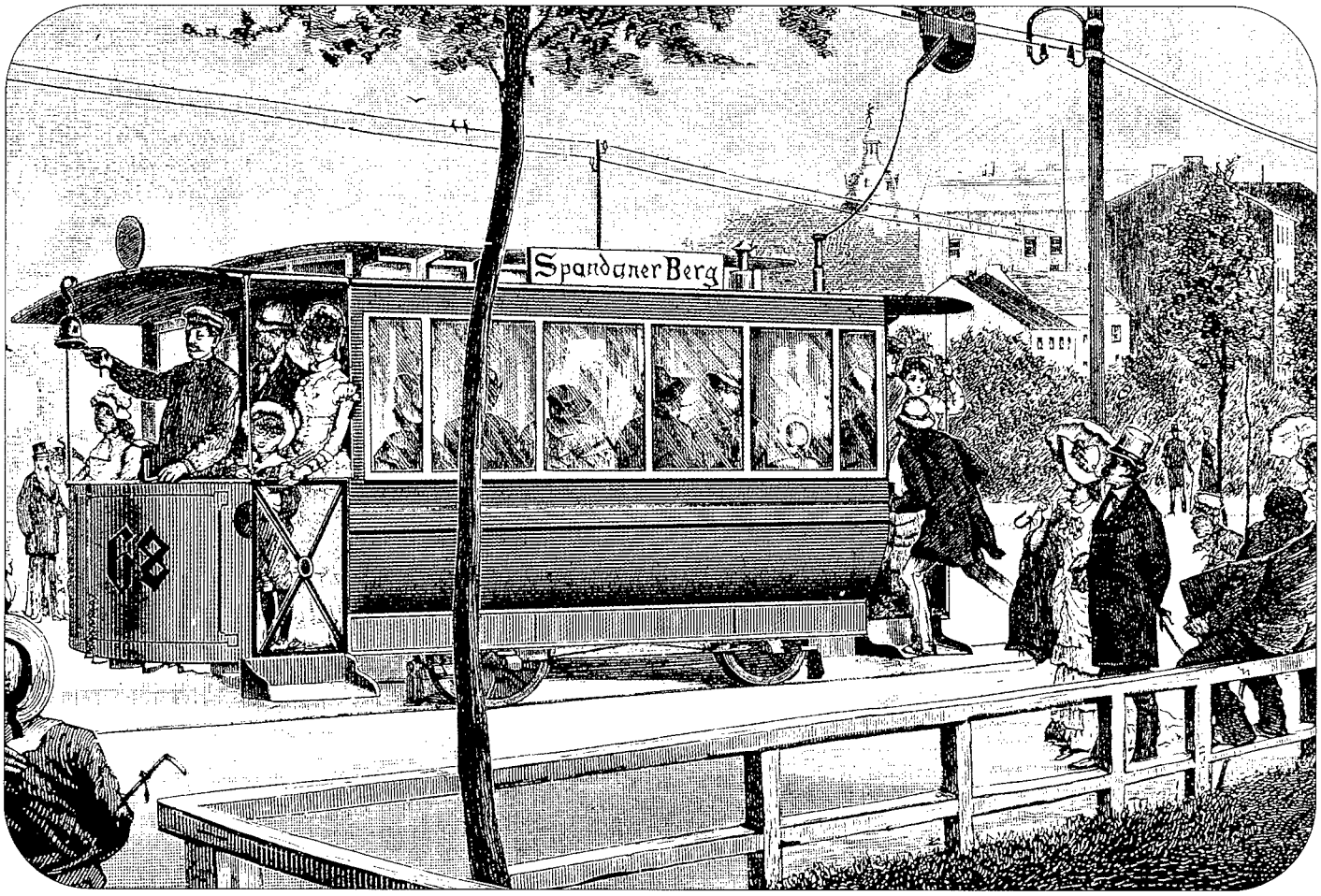
LOST RIDERS

BY BRIAN D. TAYLOR AND WILLIAM S. McCULLOUGH



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During the early years of the Great Depression, public transit ridership plummeted by one-third, marking the 20th century trend toward private automobile travel. Sixty years later, transit riding again dropped during the economic recession between 1989 and 1993, particularly on the nation's largest transit systems. Although the economy recovered during the mid-1990s and transit patronage stabilized nationally, ridership has not returned to pre-recession levels.

Between 1989 and 1993, the 5,000-plus public transit systems in the US lost 667 million annual riders out of 9.08 billion total. Eighty percent of these losses (537 million) were from the ten largest transit systems. Ridership on the New York City Metropolitan Transportation Authority's system alone—by far the nation's largest transit operator—dropped by 394 million (see Figure 1). How did the nation's most venerable transit systems, operating in the most favorable, high-density markets, lose so many riders?

The factors affecting ridership are unique to each transit system, but several universal influences are also clearly at work. First, the market for public transit continues to erode in the face of ongoing suburbanization and increased auto use. By 1990 public transit comprised only 2 percent of all trips and just over 1 percent of suburban trips. At the same time, miles of travel in private vehicles increased by 40 percent. In his analysis of National Personal Transportation Survey data, Alan Pisarski found the largest declines in transit use during the 1980s were in transit's traditionally strong markets: among women and low-income riders, and in the transit-rich Northeast.

In addition to shrinking the natural markets for transit, increasing suburbanization of metropolitan areas has spawned dozens of new suburban transit systems that compete with larger, central city transit systems for scarce subsidy dollars. Further, a variety of external mandates—"Buy America" requirements, drug and alcohol testing, and, especially, the Americans with Disabilities Act (ADA)—have combined to increase costs. Among the many ADA requirements are rules requiring paratransit services for passengers in fixed-route service areas who are unable to use the system. While such services perform an important social function, they do so at a relatively high cost—and expansion of such services reduces the cost-effectiveness of public transit. In 1994, operating cost per passenger for demand-responsive service nationwide was $13.16, compared to just $1.98 for fixed-route bus service. The effect of eroding transit markets, increasing funding competition, and expanding service mandates have combined to diminish service productivity (passengers per revenue-vehicle hour) and force service cutbacks on the ten largest systems.

While the nation's ten largest transit systems collectively cut over 600,000 annual hours of service between 1989 and 1993, the ridership losses on these systems are not simply the result of service cuts. While the two largest transit systems (in New York City and Chicago) cut over 2.8 million annual hours of service between 1989 and 1993, six of the "Top Ten" systems actually increased service during this period, three (in Boston, New Jersey, and Washington, DC) by over 10 percent. In contrast to the collective service cuts on the ten largest systems, however, transit service nationwide increased by 11.2 million annual hours between 1989 and 1993.

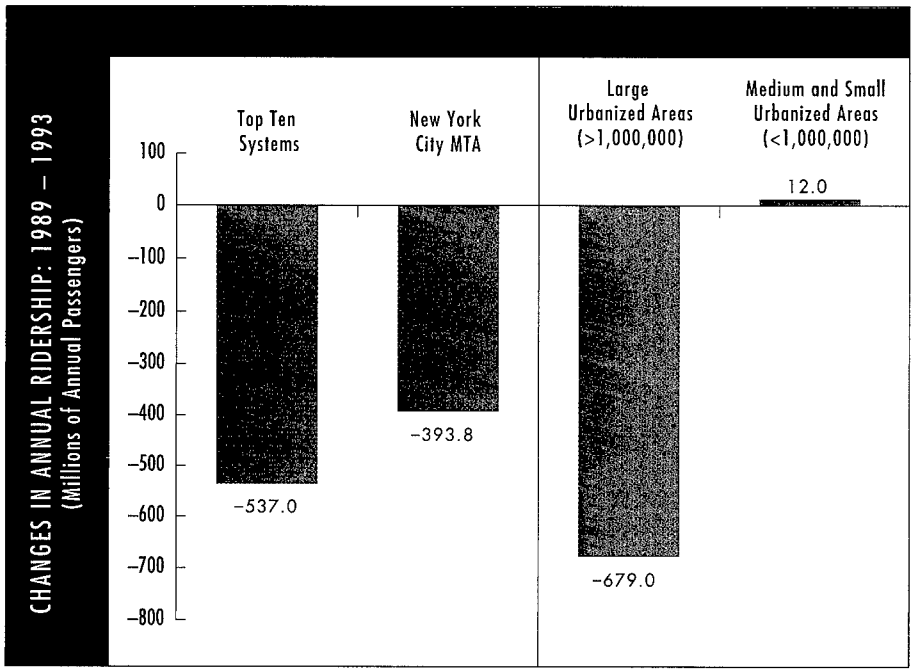
In contrast to the collective service cuts and ridership losses on the ten largest transit systems, other transit systems operating in the same metropolitan areas added 1.7 million hours of service between 1989 and 1993, and increased ridership by nearly 7 percent (see Figure 2).

Shifts in Income and Subsidies

From one perspective, this overall shift in service to smaller, suburban transit operators increased cost efficiency and permitted more hours of transit service. That's because the largest transit systems tend to be much more expensive to operate than smaller ones. In 1993, the median cost per revenue-service-hour in the Top Ten was $96.59, while other operators serving the same metropolitan areas averaged only $55.11 per service hour. But while the smaller, more suburban transit operators tend to produce transit service more cheaply, they attract far fewer riders. Transit subsidies in the suburbs buy more service but fewer passengers—and less fare revenue. ➢

FIGURE 1

Ridership Trends of the Top Ten Largest US Systems and of Urban Areas: 1989–1993



Source: US Department of Transportation, 1989, 1990, 1991, 1994a, 1994b.

Thus the vast majority of transit systems require larger and larger taxpayer subsidies over time. In some places, the growth in subsidies has been dramatic. In Los Angeles, fares and other direct income from advertising and retail concessions dropped by 25 percent as a share of total MTA revenues between 1989 and 1993, while Baltimore suffered an 18 percent drop. Most of this declining share of fare revenue has been made up through increased taxpayer subsidies. In Los Angeles, a one-cent addition in the local sales tax has been the principal replacement source for lost operating revenues, while Baltimore has turned to increased state financing. As a result the subsidy-per-revenue-hour of service on Los Angeles MTA buses and trains increased by over 50 percent between 1989 and 1993; in Baltimore the increase was 83 percent.

Faced with rising costs and flat or declining fare revenues, many transit operators, such as those in Los Angeles and Baltimore, have turned to local and state revenues to make up the shortfall. Federal operating support for transit has declined since 1980, a trend that's probably here to stay. Federal support of transit operations is based on distribution formulas favoring smaller metropolitan areas that have proportionally fewer transit users. Passengers in small urban areas enjoy federal operating subsidies at an average of $0.44 per ride, over four times the per-passenger operating subsidy for large urban areas.

State operating funds for transit have substantially increased over the past five years in response to losses in federal subsidies. However, as with federal subsidies, state funding is subject to policies and distribution formulas that may not favor the largest operators. For example, California's Transportation Development Act (TDA) follows a strict return-to-source allocation formula. The rule makes for greater subsidies for less heavily patronized suburban systems compared to those for larger urban systems operating in densely developed areas with higher levels of transit use.

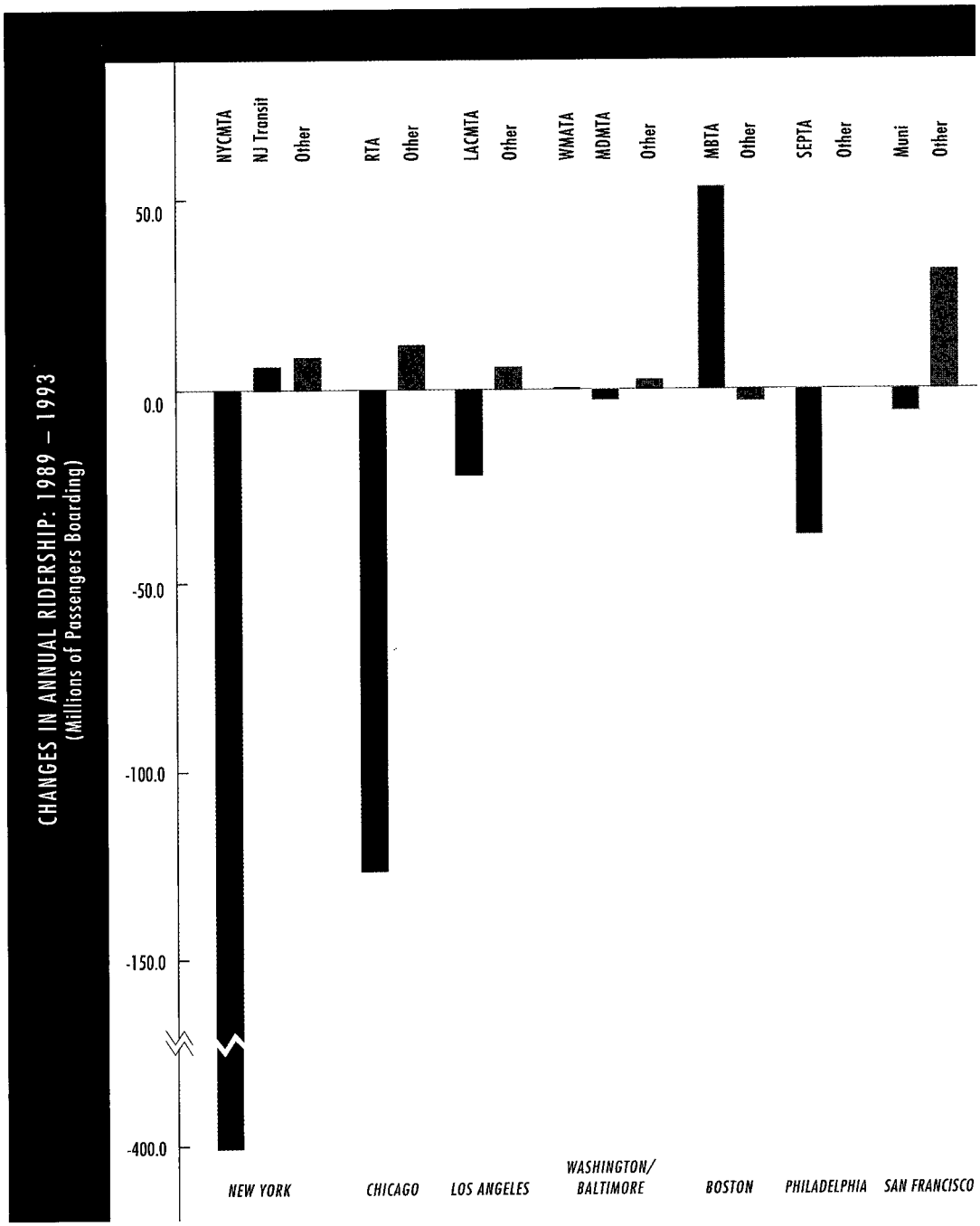


FIGURE 2

Changes in Ridership Between Top-Ten Systems and Other Area Operators: 1989–1993

Declining Service Productivity

When forced to cut service, transit operators typically seek to eliminate the poorest performing runs and routes to keep as many riders as possible. The net effect of such cuts should be to increase productivity (passengers per hour) on the service that remains. But between 1989 and 1993, service cuts in the Top Ten systems came along with a drop in service productivity. Although declining transit productivity is a nationwide phenomenon, the overall decline of 10.2 percent among the Top Ten systems is twice the rate for other systems in the US (Table 1). ➢

TABLE 1

Service Effectiveness Trends of the Ten Largest Transit Systems: 1989–1993

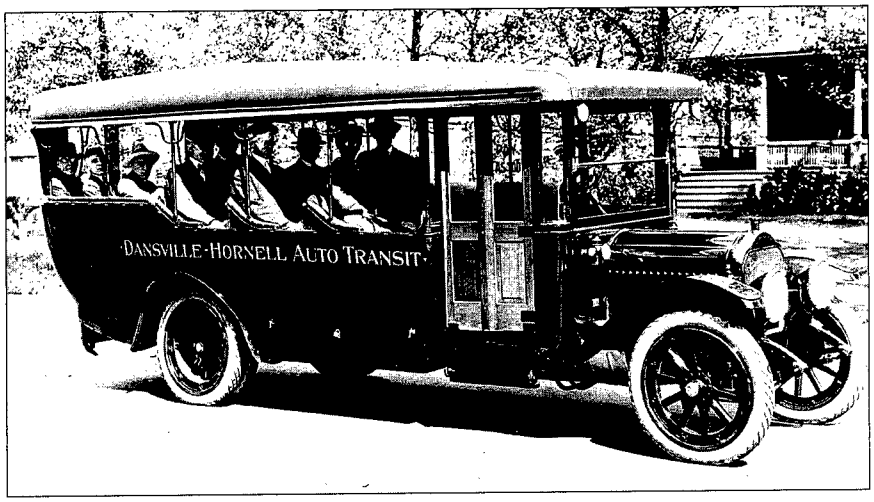
TRANSIT SYSTEM	1989 BOARDINGS PER SERVICE HOUR	1993 BOARDINGS PER SERVICE HOUR	CHANGE 1989–1993	PERCENT CHANGE
New York (NYCMTA)	74.6	65.6	–9.1	–12.1 %
Chicago (RTA)	61.6	53.2	–8.5	–13.1 %
Los Angeles (LACMTA)	60.0	56.6	–3.4	–5.7 %
Washington, DC (WMATA)	82.7	73.8	–8.9	–10.8 %
Boston (MBTA)	80.1	74.2	–5.8	–7.3 %
Philadelphia (SEPTA)	63.1	60.7	–2.4	–3.8 %
San Francisco (Muni)	76.8	77.3	0.4	0.6 %
New Jersey (NJ Transit)	34.1	30.3	–3.9	–11.3 %
Atlanta (MARTA)	55.6	51.4	–4.2	–7.5 %
Baltimore (MDMTA)	49.9	47.6	–2.3	–4.6 %
Totals	66.5	59.7	–6.8	–10.2 %

Stabilization But Not Recovery

Plummeting ridership on the nation's ten largest transit systems during the 1989–1993 economic recession stemmed from a modest cut in service and deteriorating service productivity. These ridership losses, in turn, swamped the modest increases in ridership on the 5,000-plus other systems in the US. This loss of transit ridership during the economic recession of the early 1990s is only the second, multi-year decline since the advent of federal operating support in the early 1970s (the other occurred during the economic recession a decade earlier)—and it marks a departure from nearly two decades of modest sustained ridership growth.

Trends are not uniformly bleak. During the 1989–1993 period examined here, ridership increased significantly on Boston's largest system. Ridership was stable on both New Jersey Transit and WMATA in the nation's capital (although passenger boardings per service hour declined an average of 10 percent on these three systems). Recent data indicate that ridership on NYMTA buses and trains has crept up after a precipitous twenty-year decline. But such laudable efforts to stem the tide of ridership losses in New York City most likely don't represent a turnaround in big city transit. Regarding New York, Brendan Read noted: "Unfortunately, the efforts by the MTA may resemble those of Sisyphus, who pushed a mammoth rock only to have it roll back down again."

Unfortunately the ten largest US transit systems, operating in cities with population and employment densities sufficient to support significant transit ridership, lost 537 million annual riders during the economic recession of 1989–1993. In the first two post-



recession years, the ten largest systems collectively recovered fewer than 24 million passengers. While transit ridership nationally has stabilized since the recession, transit productivity has continued to erode, suggesting that substantial increases in subsidies or substantial reductions in operating costs, or both, are needed to maintain transit ridership.

Absent radical changes to the array of public policies supporting automobile use and automobile-oriented development, it appears unlikely that the devastating ridership losses of the early 1990s will be fully regained. In particular, the continued suburbanization of population, employment, and electoral power does not bode well for the largest central-city transit systems in their competition with automobiles for passengers or with expanding suburban transit systems for scarce transit subsidy dollars. Quite clearly, the "Top-Ten Countdown" between 1989 and 1993 was a devastating and enduring blow to public transit in the US. ◆

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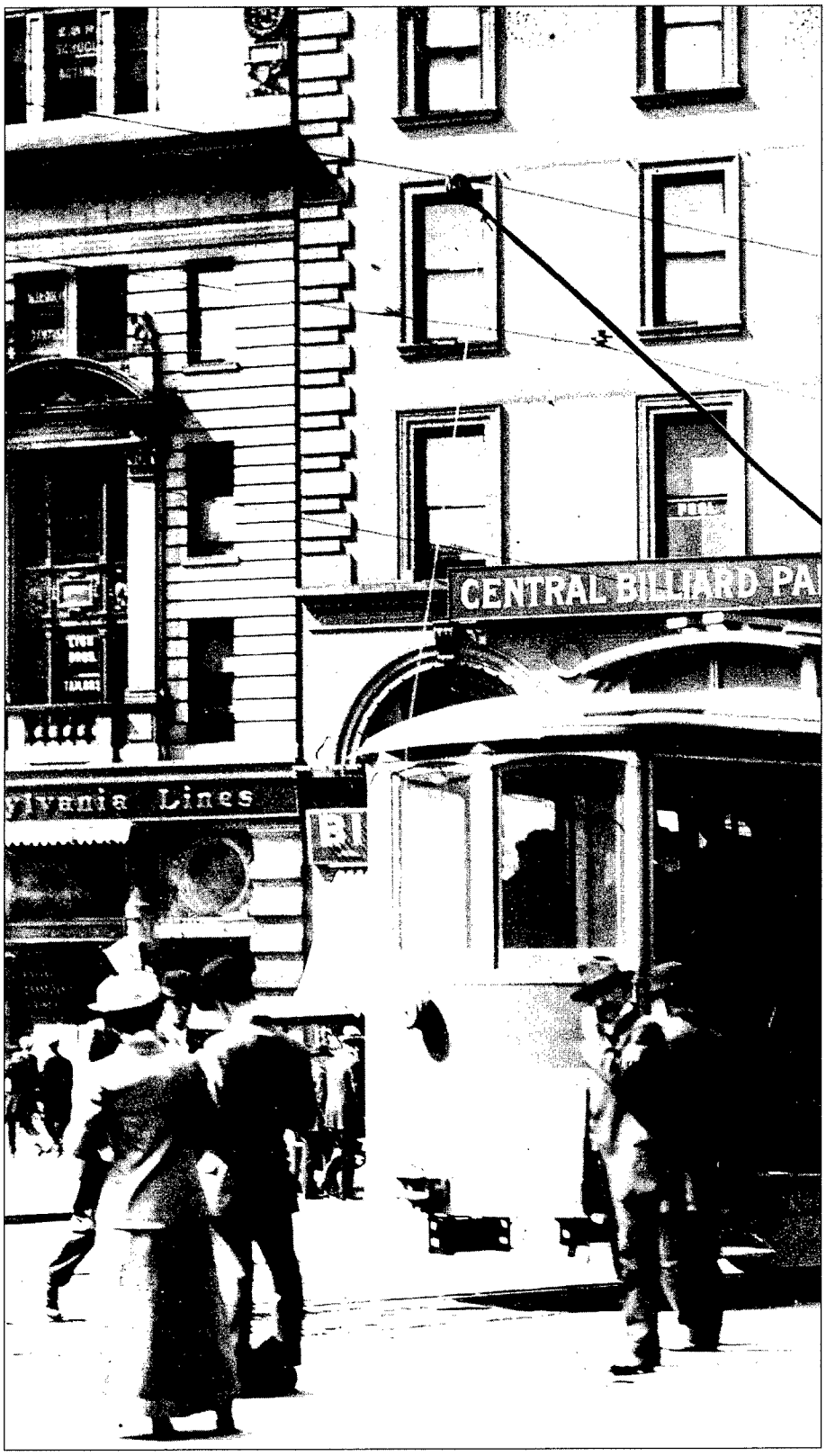

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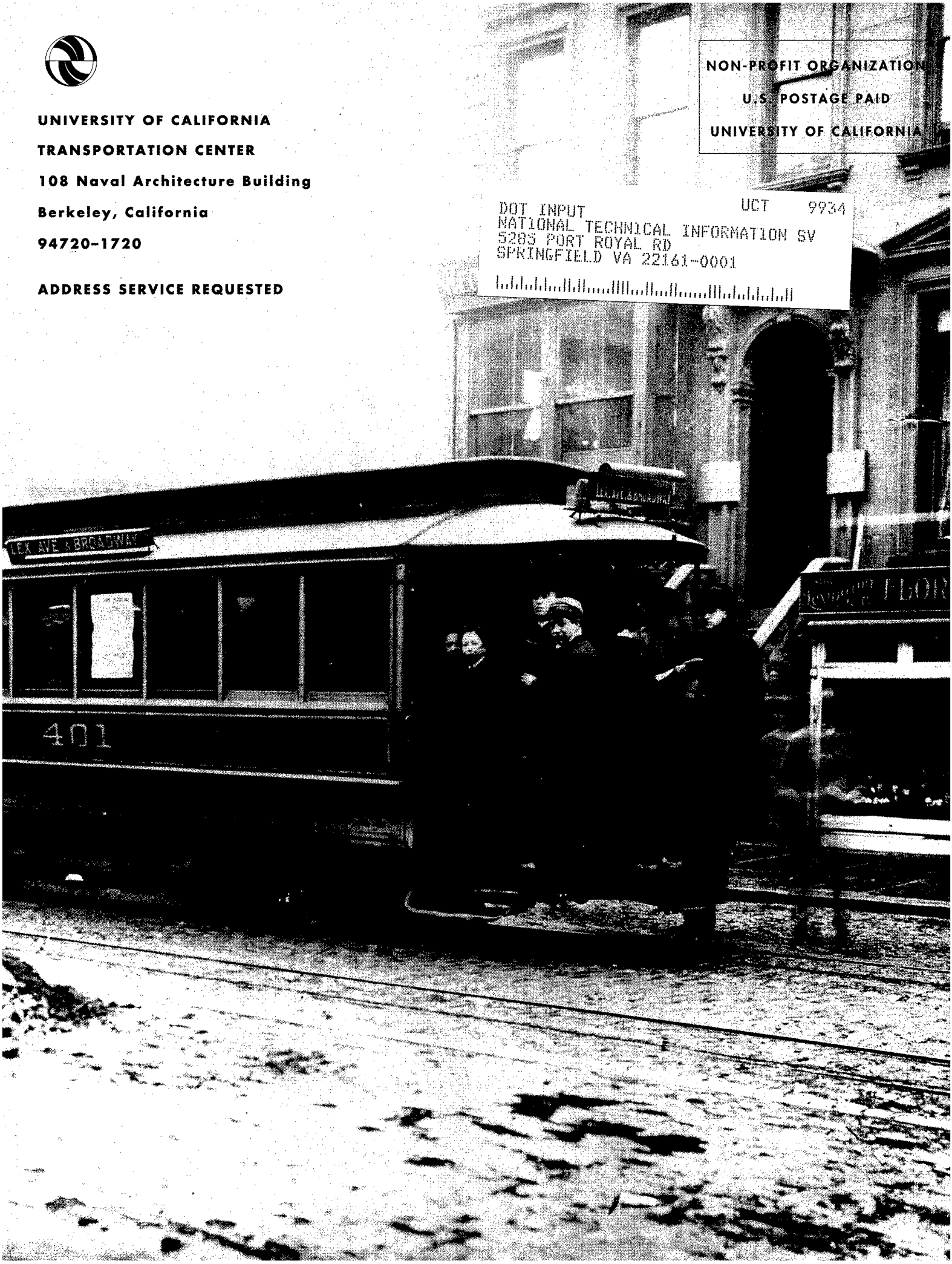
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