To: City of Bend Citywide Transportation Advisory Committee
Attn: Susanna Julber and Eric King
From: Steve Porter and Michelle Porter, Residents of Bend
Date: August 20, 2018

Public Comment:

Parking Policy Reforms to Promote Transportation System Improvements

Dear Bend Citywide Transportation Advisory Committee:

Among other goals, you have been asked to develop a transportation system plan that will "reduce congestion," "increase travel time reliability," "facilitate substantial housing supply and economic development," "decrease vehicle miles traveled," and generate "viable funding." Simple reforms to Bend's parking policies can be used to directly address each of these goals.

In the following pages we:

1) Describe the essential economics of parking spaces and policies;
2) Explain how Bend's current policies of ample free public parking and minimum parking requirements in zoning ordinances generate transportation system inefficiencies and economic losses; and
3) Set forth simple, empirically-validated parking policy reforms to enhance transportation system efficiency, improve economic activity, generate funding for transportation system operations, and facilitate housing availability and accessibility in Bend.

SUMMARY

- "Free" public parking reduces transportation system efficiency by contributing to traffic congestion, eroding travel time reliability, and harming businesses. Such parking is not *free* at all, but represents a subsidy paid to drivers.

- Minimum parking requirements distort the market for parking spaces and inflate prices paid for all goods, particularly housing. They also inhibit capital formation, business investment, and economic activity. Minimum parking requirements represent a subsidy paid to drivers.

- Minimum parking requirements and free parking incentivize driving and increase vehicle miles traveled ("VMTs").

- Economic and empirical evidence shows that converting free public parking to dynamically-priced metered parking enhances transportation system efficiency and generates revenue, a proportion of which would come from Bend's tourists, and all of which could be spent to improve life quality and business results in Bend.

- Economic and empirical evidence shows that replacing the code for *minimum* off-street parking requirements with *maximum* off-street parking caps (without changing the number of spaces indicated by code for each type of development) improves transportation system efficiency, enhances business results and economic activity, and lowers the prices of all goods, especially housing. It also increases the availability of housing, particularly for lower-income households.

- Three proposed parking reforms follow: 1) Implement dynamically-priced metered parking at public on-street and off-street parking spaces to target 85% occupancy per block-hour; 2) Remove minimum off-street parking requirements for developments, and replace those minimums with maximums, without changing the number of spaces indicated by code for each type of development; and 3) Use a share of funds generated from increased parking revenue and increased local taxes (from increased economic activity) to pay for local public services that benefit the areas in which metered parking is found (i.e., institute "parking benefit districts" similar in nature to "local improvement districts").

INTRODUCTION

The analysis and proposals set forth here derive from the work of Donald Shoup, professor of urban planning at UCLA and the leading authority on parking policy and economics. In his 750-page treatise on the economics of parking, entitled *The High Cost of Free Parking*, Shoup describes and quantifies how "free" curb parking and minimum parking requirements in zoning ordinances serve as automobile subsidies.[1] They accordingly distort behavior on a host of levels - from consumers to investors to developers - and generate poor transportation system outcomes and substandard economic results.

As Shoup explains in a recent article published in *Transfers Magazine*, the two policies of free curb parking and minimum off-street parking requirements "subsidize cars, encourage sprawl, degrade urban design, prohibit walkability, damage the economy, raise housing costs, and penalize people who cannot afford a car. …no member of the planning profession has argued that ["free" public parking and] parking requirements do not cause these harmful effects. Instead, a flood of recent research has shown they *do* cause these harmful effects."[2]

That is, free curb parking and minimum parking requirements for private developments directly contravene the goals of the Citywide Transportation Advisory Committee ("CTAC"), including, at least: 1) reducing congestion; 2) improving travel time reliability; 3) facilitating substantial housing supply and economic development; 4) decreasing vehicle miles traveled; and 5) generating viable funding for the transportation system. They also contribute to pollution, poor public health, degraded public safety, and diminished quality of life for Bend's residents.

In the following pages we summarize Shoup's findings, organized into three general sections:

- First, we touch on some essential economic features of free curb parking and minimum off-street parking requirements. We describe how such policies distort behaviors, corroding transportation system efficiency and economic vitality. We detail impacts on housing availability and affordability in particular.
- Second, we survey Shoup's three policy reforms that follow from the analysis, including mention of those proposals' successful implementations in various municipalities.
- Third, we link the proposed reforms with various CTAC goals that are presently undermined by free parking and minimum parking requirements.

We emphasize that these pages are summary in nature. **We strongly suggest that all members of the CTAC familiarize themselves with Shoup's work. It is unclear how any transportation system could be reliably analyzed or reformed without incorporating Shoup's findings.** Indeed, those findings, assembled in *The High Cost of Free Parking*, set forth volumes of empirical data and economic analysis that bear directly on the CTAC's responsibilities and goals.

---

[1] Shoup, D. *The High Cost of Free Parking*, American Planning Association Planners Press (2011).

[2] Shoup, D., "Donald Shoup's Three Parking Reforms," *Transfers Magazine* (July 19, 2018).

SOME ECONOMICS OF PARKING

Parking spaces are an economic good, the provision of which entails costs to the provider and the consumption of which implies benefits to the consumer. In this section, we briefly outline the particulars of those costs and benefits, including to whom they accrue, how they are paid for, and the level of efficiency (or inefficiency) associated with how costs and benefits are arranged.

We find that free and abundant parking incentivizes and subsidizes driving by raising the costs of all other goods - which higher costs are paid by everyone regardless of whether they consume free parking. We thus conclude that "free" parking is not actually free, that it directly raises VMTs, contributes to traffic congestion, generates sprawl, and is especially harmful to housing availability and affordability.

Complementary Goods: Parking Incentivizes Driving

It can be readily observed that parking is a complementary good of driving; without driving, there would be no need for parking, and without parking, driving to most destinations would be futile. Accordingly, parking and driving exhibit a clear economic relationship in which a *decrease in the price* of one causes an *increase in the quantity consumed* of the other. Similarly, an *increase in the availability* of one causes an *increase in consumption* of the other.

If a car owner recognizes that parking at a destination will be costly in terms of financial expense to pay for parking and/or time expense to search for parking, that person is less likely to travel by car. If, on the other hand, parking at a destination is free and generally available, the car owner is more likely to travel by vehicle.[3]

Empirical study supports the foregoing observations, but data are hardly necessary since the relationship is so obvious: Free and abundant parking for automobiles incentivizes automobile usage and ownership. Shoup describes free and abundant parking as "a fertility drug for cars."[4]

A Hidden Tax: "Free" Parking Subsidizes Driving

"Free" parking is hardly *free* in the true sense of the term. "Free" parking is just parking that is not directly paid for by the driver who consumes it. Rather, parking termed "free" is costly to provide and maintain, and those costs are paid in such fashion that they subsidize driving. Additionally, consumption of a parking space generates negative externalities that are borne by people other than the driver who consumes a parking space.

---

[3] Generalized costs of vehicle travel encompass: 1) travel time; 2) operating costs (e.g., fuel consumption, vehicle depreciation, etc.); 3) usage costs (e.g., road tolls); and 4) storage costs (e.g., vehicle parking or storage fees. For further discussion on these costs, see: Porter, "Public Comment: How Funding Needs & Transportation System Efficiency Respond to Funding Sources," (July 23, 2018).

[4] Shoup, D., "Donald Shoup's Three Parking Reforms," *Transfers Magazine* (July 19, 2018).

With respect to the costs of provision, empirical data show that each public parking space costs in the range of $5,000 to $40,000 to construct. Factors influencing final expense include: 1) the cost of 160 square feet of space (i.e., the typical dimension of a parking spot); 2) whether the space is constructed at street level versus in a multi-story garage or underground; and 3) the efficiency with which ramps or other infrastructure enabling cars to reach a parking space are constructed (which is often influenced by the scale of a parking garage requiring ramps, etc.).

Constructing street-level parking in undesirable locations is cheapest, while multi-story or underground parking in hard-to-build and high-cost regions is most expensive. Ongoing expenses associated with parking spaces entail maintenance paving, painting, security, and, of relatively high importance, financing costs associated with the initial build. Opportunity costs represent additional non-cash expenses in the form of displaced alternative land uses.[5]

In connection with public parking, these costs are borne by the public entity charged with streets development and maintenance (e.g., the City of Bend), and those funds are ultimately provided by taxpayers.[6] For parking on private lots, developers pay for construction and, following completion of development, the expenses are paid by tenants. A fraction of tenants' costs may be passed on to consumers in the form of higher prices, but those higher prices are paid by everyone, regardless of their rate of consumption of parking. Thus, taxpayers and consumers are the direct payers for "free" parking, which becomes a subsidy for drivers that can be claimed only by consuming parking spaces - thus incentivizing driving.

It is accordingly the case that the costs of providing and consuming parking spaces are not paid directly or wholly by the individuals who consume the spaces. Costs are borne instead by cities, developers, tenants, investors,

[5] One might argue there is no incremental build expense associated with on-street curb parking. This is incorrect. First, there are at least paving and construction costs associated with the 160 square feet of finished asphalt. Second, there is a very real opportunity cost for the space, which could be used for retail space, added restaurant seating, food truck location, or any number of other utilizations which, but for free parking, would generate incremental economic activity and taxes. One method of estimating opportunity cost of the space is to consider the costs of adjacent rents. If rents are, say, $2 per square foot per month, then an implied but-for "rental cost" of the parking space is $3,840 per year. At a discount rate of 5%, the capitalized value of the space (and thus its capitalized opportunity cost) is $76,800. (Note: If rents are greater than $2 per square foot per month, or if a lower discount rate is used, the opportunity cost rises.) Of note in regard to this analysis is the following: A $3,840 annual opportunity cost can be translated into an average per-hour parking fee value that would equilibrate opportunity cost and revenue generated by a paid parking space. At $3,840, an implied per-hour parking fee of only about $1.30 is calculated (8 hours per day paid parking * 365 days per year = 2,920 paid parking hours. $3,840 / 2,920 = $1.32).

[6] This pattern of public financing makes driving more attractive relative to alternatives. As described in his economic history of the United States, *The Rise and Fall of American Growth*, economist Robert Gordon describes the dawn of this form of automobile subsidy, occurring in the 1920s: "Even before World War II, public policy was skewed in favor of the automobile by building streets and highways with public funds while leaving [alternatives] to operate [without public funding]. Many of the early roads were built by issuing bonds on which interest was paid by local property taxes, so the automobile owner and transit rider paid equally to build a road system that made the automobile ever more attractive…" The same applies to public parking spaces. (Gordon, R. *The Rise and Fall of American Growth*, Princeton University Press (2016).)

shoppers - essentially everybody other than the motorist.[7] And, when a parking space is consumed, additional non-financial costs are generated in the form of negative externalities.[8] Those non-financial costs are borne by society at large. At best, only a small fraction of the cost of occupying a "free" parking spot is paid by the driver. The majority of costs actually *accrue to the driver in the form of subsidies*.

As an example, consider free curb parking in downtown Bend. The costs of provision and maintenance are ultimately paid by resident taxpayers, mostly in the form of property taxes. If a tourist consumes the parking space for two hours, and if each hour has a pro-rata provision and maintenance cost of $1, then the tourist receives a $2 subsidy for driving.[9]

Similarly, consider free parking at a retailer. Initially, the developer of the site pays construction costs for each parking space, and those costs are then built into retailer-tenant rents. The retailer's rent cost is paid through the two mechanisms of increased retail prices and reduced owner profits.[10] To the extent parking costs are built into consumer prices, the inflated prices are ultimately paid by shoppers regardless of whether they drove to the retailer or not, thus penalizing non-drivers and subsidizing drivers.

Such subsidization is clearly inefficient since it directly incentivizes higher driving levels (i.e., increased VMTs) that impose financial and other costs on the transportation system (thus increasing transportation funding needs). Additionally, consumption of parking spaces generates negative externalities that include traffic congestion, pollution, decayed travel time reliability, and many others. Meanwhile, higher prices for all goods are necessary to support these parking subsidies, and these impose inequitable burdens on consumers, acting as a severely

[7] Any costs actually borne by the driver for "free" parking are borne regardless of whether that driver consumes the parking space or not. The costs are therefore "sunk" in effect and can only be "claimed" as an in-kind subsidy when the driver consumes the space. This financially incentivizes driving.

[8] Negative externalities are "external" costs associated with the private transaction or consumption of a good - that is, they are costs not paid by the private parties engaged in the transaction or consumption. A common example is secondhand smoke from cigarettes. Nonsmokers "pay" for smokers' habits when they breathe polluted air that raises their risk of cancers and other maladies. It is typical to tax goods that generate negative externalities as means to "internalize" some of the externalized costs and to reduce quantities consumed. One such externalized cost can be termed "displacement" in which a rival parker is excluded from a space that is already occupied despite a higher willingness to pay than the already-parked driver. To deal with this cost of displacement, the construction of a sufficient number of parking spaces to comfortably house all possible demand for free parking - and then some - is a common answer. This answer is supremely inefficient, however, and more efficient answers can be readily deployed with superior results. As will be described later, most economic markets solve this issue of rivalry by charging market prices such that purchase price sorts consumers on the basis of willingness to pay. Unfortunately, with "free" parking, the behavioral result among drivers is to engage in "cruising," (i.e., driving around in search of a convenient and free space), which generates pollution, excess traffic, and fatalities.

[9] Similar analysis holds for non-tourists, except a small share of the subsidy would be removed since the resident taxpayer would have contributed some share of the pro-rata cost of provision and maintenance of the consumed space.

[10] If all incremental rent cost cannot be passed on to consumers, then the remainder will reduce owner profits. Shoppers and company owners pay all the costs of parking, in proportions that depend upon the retailer's pricing power.

regressive tax since the higher prices affect all goods and any price level increase measured in dollars consumes a greater share of lower-income household disposable budget.

Bundles of Inefficiency: "Free" Parking Destroys Housing Affordability and Availability

"Free" public parking and minimum parking requirements inflate the prices for everything since the costs of providing and maintaining parking spaces get built into consumer prices and tax rates. This is due to costs of parking being "bundled" into the prices of all goods, which is economically and socially inefficient since non-drivers pay the same higher prices and taxes as drivers and since higher prices bear inequitably on the poor. From this follows a dynamic under which parking costs are spread among all consumers and taxpayers - regardless of whether they consume parking - and thereby subsidize drivers.

Nowhere is this inefficiency of "free" parking and minimum parking requirements more apparent than in housing, where home prices and rents are elevated due to parking policies, and the availability of affordable housing is degraded. Indeed, in a perverse arrangement of giving to the rich by stealing from the poor, residents with the lowest incomes pay the highest penalties associated with housing, thereby subsidizing higher-earning households.

Three factors work synergistically to reduce housing affordability and availability in this context. First, minimum parking requirements imposed upon private developments increase housing construction costs. Second, the culture of free parking and minimum parking requirements cause developers and property owners to "bundle" parking with housing. This means the costs of parking construction and maintenance are absorbed into housing and rental prices, and since those costs cannot be unbundled, they raise housing prices and rents and reduce availability, particularly for the poor. Third, minimum parking requirements reduce housing density by consuming real estate that might otherwise be developed into residences and thereby diminish housing supply. Since housing availability/affordability is of special interest in Bend, each effect is described in turn below.

Minimum Parking Requirements Increase Housing Construction Costs

In Bend, multifamily residential units have minimum parking requirements based upon the number of bedrooms per unit. A 2-bedroom unit requires at least 1.5 parking spaces. If the cost of building each parking spot is $5,000, then each housing unit becomes $7,500 more expensive to construct. On a ten-unit building the added costs are $75,000. For a 100-unit building, the costs scale to at least $750,000.[11] Such costs are not negligible from a developer's perspective, as they add to capital requirements, increase borrowing/interest costs, concentrate and magnify business risk, and distort developer preferences toward higher-priced, lower-unit housing developments that reduce housing availability particularly for lower-income households.

[11] Parking costs for large developments on the order of 100 units or greater can be much higher than $5,000 per space. If a multi-story garage or underground parking is required, costs per space can balloon to $40,000. In that case, a 100-unit development containing all 2-bedroom apartments would require 150 parking spaces costing a grand total of $6,000,000 to build.

The dynamic of shunting development away from low-cost housing can be illustrated as follows. Construction cost per square foot of some housing can be in the range of $100. A 1,000-square foot apartment thus has a construction cost of roughly $100,000. An added construction cost of $7,500 for parking raises the cost per housing unit by 7.5% on a modest home. This parking requirement serves as a "fixed cost" component of building housing and, as such, promotes larger and higher-priced units that can amortize that fixed cost over a larger housing square footage/higher total housing cost. While a home with a $100,000 cost base has total cost raised by 7.5% due to minimum parking requirements, a larger and more lavish home with a $300,000 cost base sees an increase of just 2.5% for parking. This means a developer can more readily service required parking costs with more expensive housing units, which stunts housing development for lower-income households and promotes housing development for higher earners.

Increased Housing Construction Costs Raise Housing Prices

Costs initially borne by housing developers ultimately are passed on to housing buyers. A buyer of a condominium in a multifamily building is not generally provided the opportunity to "unbundle" parking spaces from the living unit itself. Thus, the costs of providing the parking get built into the purchase cost of the condominium, and even though they *appear* "free" because they are not separately paid for, they are not actually free.

If the cost of building and maintaining each parking spot is $5,000, then each 2-bedroom housing unit becomes at least $7,500 more expensive - even for residents who do not own cars and would not pay for any standalone parking spaces if given the option to unbundle parking and living spaces.[12] This increases housing costs, distorts housing developments toward higher-income housing types, decreases housing availability, and penalizes residents who do not own cars (perhaps because they cannot afford to own cars, thus highlighting the regressiveness of minimum parking requirements).[13]

For a simple illustration of how housing prices become inflated by minimum parking requirements and how those elevated prices can become a subsidy paid by lower-income households to higher-income households, consider the following. Begin with a duplex consisting of identical 2-bedroom units, each providing 1.5 "free" and unassigned parking spaces to its occupants. The first household does not own a car because its income is too low to allow for vehicle purchase and maintenance, so this household does not consume any of its 1.5 spaces. Nonetheless, due to bundling, it pays for those spaces' construction and maintenance through higher housing prices. The second household has higher income and, as a result, owns three cars. The second household thus consumes not only its 1.5 spaces but its neighbor's 1.5 spaces as well. Thus, the lower-income household pays a

[12] Due to the opacity of housing and parking costs in bundled units, it is likely that the construction cost of a parking space has added to it a profit markup consistent with the markup percentage of the housing unit. If profit rates reflect, say, a 10% markup, then 2-bedroom housing prices are increased by $8,250 per unit due to minimum parking requirements.

[13] This analysis holds as well for apartments that are rented rather than purchased. Instead of being built into the purchase price, the cost of parking is folded into rents paid by tenants.

subsidy of roughly $7,500 to the higher-income household. This dynamic plays out similarly, if more subtly, throughout Bend.

Minimum Parking Requirements Generate Sprawl and Reduce Housing Availability

Since parking spaces, as their name implies, take up *space*, minimum parking requirements reduce the number of housing structures that can be built on a given parcel of land and reduce overall housing density. They thus cause "sprawl" due to parking's land requirements that push housing outward.

Each parking spot requires 160-square feet of space. For a 100-unit housing development of 2-bedroom homes in Bend, that translates to a land requirement of 24,000 square feet (i.e., a little over one-half of an acre) for parking. Since building multi-story and underground parking garages can be eight times more expensive than building street-level parking, developers are financially incentivized to ensure they have sufficient land for street-level parking. They therefore modulate the scale of housing development on a given parcel to satisfy required parking without garages. This directly reduces housing availability by depressing the number of units built per parcel of land. It also indirectly reduces housing availability by contributing to "sprawl" that spreads housing developments ever-outward to accommodate street-level parking. This, perversely, induces car dependency, which serves as its own regressive tax on low-income households.

Accordingly, minimum parking requirements for developments subsidize drivers at the expense of everyone else, with the greatest concentration of inequities found among the poorest (i.e., those who cannot afford vehicles and either pay for parking they do not use or are forced to purchase vehicles that accommodate sprawl but impose financial overextension). Additional inequities derive from higher housing costs that bear disproportionately on lower-income households, reduced housing availability for lower-income households, "mandatory" payment for bundled parking (even for households without cars), and inefficient/unwanted car ownership for lower-income households. "Free" parking and minimum parking requirements are severely regressive wealth transfer mechanisms - and are inefficient ones even at that task since they also generate negative externalities.

Bend's Housing Crisis and Minimum Parking Requirements

Bend has predominantly free public parking and significant minimum parking requirements for all residential, commercial, and industrial developments. Seemingly separately, Bend faces severe funding shortfalls for its transportation system's maintenance, and the city has a "housing crisis" in which affordable housing is largely unavailable. In addition, Bend faces demand to relieve growth pressures and to curtail housing shortages with costly, unsustainable sprawl expansion.

Though at first glance these issues do not appear directly linked, they are in fact intimately related with one another, and Bend's parking policies are a common cause.

Bend's transportation system can be made more efficient, can raise sustainable funding, can enable housing affordability and availability, and can forestall costly and unnecessary sprawl expansion simply by eliminating "free" public parking and removing minimum parking requirements for developments. Many cities have recognized this link between, on the one hand, parking, and, on the other, transportation system efficiency, housing availability, and sprawl. Those cities, some of which will be highlighted in the next section, have enacted efficient parking policies. Bend should similarly recognize and act upon this link.

The three following policy proposals summarize how Bend can improve its transportation system, solve its housing crisis, and facilitate efficient and sustainable growth by making modest reforms to its parking policies.

THREE PARKING REFORMS

Shoup's three parking policy reforms are interlinked. Each supports the others, working synergistically to generate positive outcomes. Adoption of one without the other two, or adoption of two without the third, would reduce efficacy and so, in a sense, these three proposals are singular. Shoup summarizes as follows:

> Spending the meter revenue to improve neighborhood public services can create the necessary political support to charge the right prices for curb parking. If cities charge the right prices for curb parking to produce one or two open spaces on every block, no one can say there is a shortage of on-street parking. If there is no shortage of on-street parking, cities can remove their off-street parking requirements. Finally, removing off-street parking requirements will increase the demand for on-street parking, which will increase the revenue to pay for public services.[14]

The policies are also joined by their conceptual underpinnings. Each depends upon *the creation of a market for parking* where, at present in Bend, no such market truly exists.

In free-market economies, we are accustomed to reliance upon market dynamics to solve problems of resource allocation, production, and consumption. Markets, when properly structured and operated, generally provide efficient outcomes, and we do not question their role in things ranging from international financial settlements to everyday activities like shopping for groceries, purchasing clothes, or paying for movie tickets. We rely upon markets and the information conveyed by market prices to make decisions, allocate budgets, and guide behavior. Suppliers of goods similarly rely upon market information to determine production rates and product specifications.

Markets can likewise be arranged around parking such that: 1) the right number of parking spaces is created, and those parking spaces are distributed efficiently; 2) spaces are consumed by motorists efficiently on the basis of

[14] Shoup, D., "Donald Shoup's Three Parking Reforms," *Transfers Magazine* (July 19, 2018).

linking consumption costs with prices paid; and 3) new tax/fee revenue received is allocated, at least in part, to benefit those who suffer negative externalities associated with parking consumption.

Adoption of these policies results in improved overall efficiency of the transportation system, including reducing VMTs, resolving congestion,[15] enhancing travel time reliability, supporting economic activity, and promoting housing availability and affordability.

Dynamic Pricing of Public Parking

Public parking is an economic good. That is, consumption of parking implies benefits accruing to the consumer who uses it. When parking is priced at zero, those benefits are likely to be inefficiently allocated, resulting in lost consumer welfare.[16] Moreover, when public parking is priced at zero, retailers, employees, and residents situated along free parking corridors suffer from business losses,[17] health erosion, and other negative externalities.

Markets resolve consumer welfare losses and can address other negative consequences associated with an unresponsive pricing mechanism by allowing price to fluctuate. This enables efficient allocation of scarce resources and, meanwhile, generates incremental public revenue. To activate market efficiency and revenue generation with respect to parking, prices for curb parking must be allowed to respond to demand in much the same way prices respond to demand in other markets.

On the basis of economic reasoning and empirical research, Shoup recommends that public parking be priced dynamically to target a rate of 85% block-hour occupancy.[18] For instance, if a block-face of curb parking has 15

---

[15] One important dimension of reduced VMTs and resolved congestion owes to the elimination of "cruising" for free parking spaces. Empirical evidence shows that cruising can account for up to *96 percent of VMTs* in urban districts with free curb parking. A study conducted in Westwood, California, reports that the share of traffic cruising for parking spaces accounted for 68% of vehicles from 8 a.m. to 8 p.m. That is, on average, well less than one-third of all traffic in an urban district with free parking was not actively searching for a space, with the proportion of cruising to total traffic increasing as parking occupancy rates climbed above average.

[16] Consumer welfare (or "consumer surplus") is generally calculated as a consumer's willingness to pay for a good minus the price actually paid. In markets where price fluctuates in response to demand, those consumers with the highest willingness to pay for a given good (i.e., those who benefit most from consumption of the good) "bid" price upward and obtain the good, while those less interested in consumption exit the market at the higher price. The good thus becomes efficiently allocated on the basis of price. When the price mechanism is disabled, scarce resources tend to be allocated on a "first come" basis, which leads to perverse incentives and can allocate resources among those with low willingness to pay, excluding those whose consumption would generate higher levels of consumer welfare.

[17] This point will be discussed more below. At a high level, zero-priced parking both "crowds out" more qualified shoppers and incentivizes shoppers to dally, reducing customer turnover. Both effects are empirically shown to harm business results. Additionally, zero-priced parking inordinately harms businesses that would tend to discourage driving to their locations since those businesses pay parking subsidies just like all other retailers in a given district. There is thus incentive to encourage driving for retailers to "capture" the subsidies they and their customers are obligated to pay. This effect can encourage greater VMTs.

[18] "Block-hour" simply refers to the parking spaces along each block, hour by hour through the day.

parking spaces along it, then prices each hour of the day should be allowed to adjust such that an average of two spaces remain vacant during each hour. The reason a revenue-maximization goal is eschewed in favor of an occupancy goal is that, by pricing parking so that some spaces remain available, drivers will not resort to wasteful "cruising" for spots, so low-value VMTs and all attendant negative consequences of low-value VMTs will be eliminated. Instead, anybody with a sufficiently high willingness to pay for parking will always be able to find an available space within a block of their destination. Those with lower willingness to pay for parking can always park where demand (and prices) are lower.

Parking meters should ideally be programmed to incentivize parkers to shorten the duration of their parking consumption so as to facilitate parking turnover since this benefits businesses and increases economic activity. In unmetered (or inefficiently metered) parking situations, parkers will tend to stay put for as long as they can. If parking is priced by the half hour and pre-paid, then somebody is more likely to stay put roughly for a half hour, even if the business they conduct requires only fifteen of their 30 minutes.[19] If parking is priced by the minute, the marginal cost structure removes incentives for dallying and encourages shoppers to "park-purchase-and-exit" without undue time wasting.

This action improves business results for retailers and restaurants abutting curb parking spaces and/or situated near public parking garages because it increases customer turnover and enables consumers who would have been turned away by full-occupancy parking to park nearby and shop. It also "sorts" customers by generalized willingness to pay for the goods and services that caused them to make the trip in the first place. Customers unwilling to pay a small price for parking are unlikely to be large retailer or dining spenders.[20] Metered parking also discourages employees from consuming "prime" parking spaces, leaving spots for customers.

Additionally, a well-functioning pricing mechanism for parking can cause drivers to temporally shift their trips away from the most in-demand hours of the day to lower-demand (and lower-priced) hours. This smooths demand patterns for retailers and restaurants, improving service levels and enhancing labor and capital productivity.[21]

---

[19] One of the most inefficient and destructive public parking policies is that currently deployed in downtown Bend, where parking is free but capped at two hours. Enforcement of this is done by foot patrol. Unfortunately, evading such policies is easy and enforcement is very expensive. Moreover, the 2-hour cap tends to incentivize drivers who have found a free space to consume it for approximately two hours.

[20] One concern could be stated as a question: What happens in the event of recession, when a larger share of consumers experience a generalized reduction in willingness to pay? Could dynamic parking pricing discourage people from shopping? Here it is important to recall that pricing is dynamic and responsive to demand. If a generalized reduction in aggregate demand occurs (as in recession), parking prices would fall accordingly - perhaps to zero if 85% occupancy is not achieved at non-zero prices. Thus, the dynamic pricing mechanism accommodates recession risk.

[21] When retailers and restaurants are overcrowded at peak hours, diseconomies can occur as facilities fail to accommodate required staffing levels and/or assets become inefficiently overbuilt to meet peak demand.

Reflecting the foregoing, empirical evidence shows that metered curb parking outperforms free curb parking with respect to business results, and, in districts where metered parking has been installed on some streets but not others, businesses on unmetered streets have petitioned to have meters installed on their blocks.[22]

Various parking meter technologies are available that allow for dynamic pricing, programmed from a central location. Such meters can function with occupancy detectors that allow for minute-by-minute charging of customers so as to generate a truly marginal cost structure. The meters also can be used with "smart cards" that allow for differential pricing schemes arranged to benefit residents by discounting their rates.[23]

Shoup's work provides overview of many such technologies that could be readily adopted by Bend and discusses financing arrangements made by sellers of these meters such that little to no out-of-pocket cash is required for their installation. That is, parking meters can be purchased so that they carry essentially zero financial risk. Since acquisition of parking meters represents the sum total of outlays required for adoption of all three parking reforms, total costs for reforming parking in Bend would be negligible, up-front cash requirements would approximate zero, and, due to the positive revenue generation of parking reforms, costs would be recouped quickly.

The total revenue potential of dynamic pricing depends upon various factors, including the total number of parking spaces to which meters are applied, demand characteristics, and substitution rates between driving and non-driving modes for trips to metered districts. The experience of Aspen, Colorado, which generates $600,000 per year in new revenue from metered parking, is useful as a benchmark, but likely far understates potential in Bend since Aspen's population is less than 7,000 people, or around 7% of Bend's, while both cities enjoy high rates of tourism. Were Aspen's experience to scale proportionally to population, Bend could generate about $8.5 million annually from metered public parking, not including additional tax receipts from incremental business activity in metered districts.

It is notable that dynamic pricing, whatever its ultimate revenue potential in Bend, generates funds now absent from Bend's public revenue stream and reduces low-value VMTs from the city's roads, which has the salutary effect of decreasing transportation system funding requirements. Dynamic pricing of parking thus closes Bend's funding gap through two complementary mechanisms.

---

[22] The earliest instance of this occurred in 1935 in Oklahoma City, where parking meters were invented and first deployed: "…although at the time of the initial installation most everyone had been skeptical of what the meters would accomplish…within a few days other businesses were asking for meters on their streets, and within several months far more than the original 150 units had been installed." Shoup, D. *The High Cost of Free Parking*, American Planning Association Planners Press (2011), quoting Fischer, L., "Gerald A. Hale: Parking Meter Reminiscences," *The Chronicles of Oklahoma*, Vol. 48, No. 3 (1969).

[23] For more discussion on this point, see: Porter, "Public Comment: How Funding Needs & Transportation System Efficiency Respond to Funding Sources," (July 23, 2018).

Elimination of Minimum Parking Requirements

At present, Bend's zoning code sets forth minimum parking requirements for essentially all land uses, a policy that generates a host of inefficiencies and losses. Shoup recommends eliminating minimum parking requirements and replacing them with maximum parking caps, summarizing as follows:

> If we want to reduce traffic congestion, energy consumption, and air pollution, the simplest and most productive single reform of American zoning would be to declare that all the existing off-street parking requirements are maximums, without changing any of the numbers, just as the London borough of Kensington and Chelsea did in 1995. From that point we can let the market take care of parking, and let city planners take care of the many vital issues that really demand their attention.[24]

The first step to understanding basis for Shoup's recommendation begins with exploration of how required minimum parking requirements are promulgated in the first place - a process that, for most U.S. cities, is essentially bereft of reason or any statistical validity. Although Bend's code does not disclose the basis for its requirements, we have undertaken a limited review of parking recommendations made by the Institute of Transportation Engineer's *Parking Generation* manual as well as other cities' minimum parking requirements.[25] Bend's requirements appear to reflect the *Parking Generation* recommendations as well as the typical minimum parking requirements in other cities. Thus, whether the direct source of Bend's policies is *Parking Generation* or codes from other cities, it would appear that Bend's minimum parking requirements do ultimately reflect at least some findings of *Parking Generation*.

This observation supports Shoup's broader assertion that most cities' minimum parking requirements are based largely upon "statistical research" published in *Parking Generation*, and sometimes upon "peer cities'" parking codes (which are often themselves derived from *Parking Generation*). Thus, most cities' parking requirements are largely undifferentiated from one another's, as in Bend's case.

Bend's reliance upon *Parking Generation* (whether directly or indirectly) is problematic and leads to poor outcomes since parking requirements deriving from *Parking Generation* are based upon circular logic, statistically indefensible "survey" data, and farcical extrapolation.

The *Parking Generation* manual purports to provide data showing "parking demand" for various types of land uses and then recommends parking space requirements modeled, generally, on land use type and size of structure. For instance, in Bend, a restaurant must supply at least one parking space per 200 square feet of gross leasable floor

[24] Shoup, D. *The High Cost of Free Parking*, American Planning Association Planners Press (2011).

[25] *Parking Generation* is a report published by the Institute of Transportation Engineers.

area. The land use type defines the multiple, and the size of the structure informs the base to which the multiple applies. (Incidentally, a restaurant in Bend sized at 200 square feet would require at least one parking space, which would be sized at 160 square feet. We can quickly see how parking requirements cause land used for just about anything to imply parking space that rivals the quantity of land dedicated to the use itself, thus leading to sprawl.)

Problems with reliance upon *Parking Generation* are manifold.

- First, the data derive from surveys of suburban areas where, typically, there is no alternative but to drive to a destination, so they are biased toward heavy car use conditions, even though the surveys' findings are often applied to non-suburban settings where alternative transportation is available. That is, the findings, even if they were meaningful, often are misapplied when *Parking Generation*'s recommended values are codified for cities.
- Second, the survey data reflect peak parking occupancy, so the survey data show figures reflecting maximum parking space consumption (which condition may only be encountered a few hours per year), and then those figures are given as suggested *minimum* parking space requirements, biasing yet further toward high parking requirements. This circularity - taking what is an *observed maximum* and then recommending that value become a *required minimum* - would be comical but for its negative consequences.
- Third, many of the reported land uses surveyed rely upon *only one to four surveyed parking lots* to provide data, which violates even the most basic tenets of statistical analysis and undermines essentially any findings from the publication. Statistical evidence depends upon a diversity of observations so that "signal" is clarified from "noise." By limiting surveys to only a small number of observations - *just four or fewer observations in half of reported land uses, and just a **single** observation in 22 percent of land uses* - noise and signal are indistinguishable and the statistical value of the analysis goes to zero.
- Fourth, correlations between each land use's "base" (e.g., gross leasable floor area) and its "multiple" (i.e., number of parking spaces required per unit of base value) are generally non-existent. In other words, despite statistical evidence that, for example, gross leasable floor area *does not* correlate with parking space consumption, *Parking Generation* nevertheless uses it as a "base" for a given structure's parking requirements. Such extrapolation is not only specious but is also wasteful for cities adopting the recommendations.

Collectively, these problems are fatal and render "statistics" found in *Parking Generation* useless for informing city code minimum parking requirements.[26]

[26] In the 2017 Bend Parking Demand Evaluation Summary (Bend Parking Demand Assessment, August 2017 (v.3)), mention of the ITE approach is made: "This is the same methodology employed by the Institute of Transportation Engineers (ITE) to calculate parking demand by land use category. The ITE manual is the de facto source of parking data for most jurisdictions. However, while the ITE information is a good starting point, it draws samples from across America, includes demand figures that date back as far as the 1980s, and contains data from extremely small samples." This summary critique is incomplete and somewhat misleading since it fails to fully capture the shortcomings and problems of the ITE manual. Moreover, it implicitly endorses the general approach used in *Parking Generation* of the "base" and "multiple" framework, despite strong evidence that such framework can be fundamentally unsound.

A much better approach to ensuring that an appropriate number and distribution of parking spaces arise in a city is to not to depend upon deficient and misleading "data," but to let free-market principles guide decision-making about parking supply and location. For instance, as a developer designs and builds a new restaurant, determination of the count and location of parking spaces should be left to the developer. The developer has every incentive to build appropriately, else the development will go un-leased (or will have to lease at a sub-market rate) and harm the developer's profit margin.

Similarly, as development of multi-family housing occurs, discretion of parking spaces should be left to the developer, as informed by market forces. By causing construction of parking spaces to become a point of discrete consideration in the financial process of real estate development, greater diversity of housing types would arise, inefficient "bundling" would decline, more spaces would be leased separately to avoid regressive subsidy problems, land would be used more efficiently, and precursors of sprawl and car dependency would recede.

Imposition of minimum parking requirements harms economic activity by raising new development costs and discouraging certain types of new developments, and it also can contribute to blight and stunted economic growth by deterring the redevelopment of buildings into uses other than those for which the building was initially developed. For instance, if a business's building/land use initially called for four parking spaces by code, and that original business fails, then a successor business in a different industry (say, food service rather than retail) for which more parking spaces are required would be discouraged from redevelopment by high costs associated with adding new spaces. This frustrates new business formation, reduces local investment, lessens consumer choice, and shifts entrepreneurial spirit away from Bend to competitor cities. Under a free market condition, such deterrence would be extinguished, new business development would increase, and general economic activity would rise.

Shoup recommends replacing *minimum* parking requirements with *maximum* parking spaces on a land use basis, while keeping the number of spaces indicated for each land use the same. For example, if a 2,000-square foot restaurant requires a *minimum* of 10 parking spaces under Bend's current code, then the revised code would indicate a *maximum* of 10 parking spaces for that restaurant or any identical eatery. The purpose of capping parking spaces is threefold: first, to reflect the fact that codes reliant upon *Parking Generation* statistics basically reflect greater-than-maximum parking space needs, so the numbers already in city codes tend to exceed real-world needs and can thus serve a role in establishing a maximum allowable build level; second, to support metered parking by restricting the amount of retail-subsidized "free" parking that comes online; and third, to enable creation of a market for additional parking spaces desired by a developer who wants to exceed code.

This third point works as follows. If a developer desires to construct more parking on a parcel than allowed under code, the developer will only want to do so if it is financially advantageous. The city can capture some of this additional anticipated developer profit by charging developers for exceeding code maximums. This procedure

generates a new revenue stream for the city. It also encourages creativity on the part of developers to work to reduce parking demand at their sites by, for example, facilitating non-driving alternative transportation modes.

Significantly, by changing minimum requirements to maximum caps, the parking code shifts from *discouraging* density and infill development to *encouraging* density and infill. At present, due to minimum parking requirements that are excessive because they are based on upwardly biased and unreliable "statistics," a great deal of land value is held hostage in parking spaces on private land developments. Removal of minimum requirements allows that hostage value to be released by upgrading inefficient parking spaces into new uses. This facilitates new business investment and raises land values while reducing rents imposed on current tenants who pay for excess parking.

It also, by facilitating infill, improves city density and thereby enhances walkability, which serves to reduce VMTs. As with metered public parking, the replacement of minimum parking requirements with maximum caps generates new city revenue and reduces stress on the transportation system, thereby closing the funding gap through two complementary mechanisms.

Creation of Parking Benefit Districts

Converting "free" public parking to dynamically-priced metered parking and changing minimum parking requirements to maximum parking caps create tremendous efficiencies for businesses and the transportation system while generating new streams of revenue for the city. There can nevertheless be certain political resistance if the benefits and costs of parking policies are not equitably distributed. "Parking benefit districts" address this issue by earmarking a portion of funds generated from an area's parking meters to pay for public services in that particular area.

This tactic creates natural political constituencies to support the implementation of paid parking and the reduction of privately developed parking. Instead of unmanaged parking in a given area being considered by residents to be an eyesore that reduces life quality, regulated parking that generates money earmarked to benefit residents in the area becomes a source of funds for improved life quality. Residents then support policies that generate these funds from which they benefit.[27]

[27] See: Porter, "Public Comment: How Funding Needs & Transportation System Efficiency Respond to Funding Sources," (July 23, 2018). Political perspective of this scheme is set forth in some detail in this earlier comment, so additional political considerations will not be revisited here.

Indeed, funding potential is substantial. Consider the conversion of free curb parking in downtown Bend to metered parking that generates, say, $400,000 in new net revenue each year.[28] If 50% of those funds were earmarked to benefit retailers and others in downtown Bend by, for instance, supporting additional police presence, cleaning sidewalks, promoting events, etc., the city would receive $200,000 in new funding, while the downtown district would benefit from a large infusion of cash to pay for the improved public services that it deems most useful. Meanwhile, shoppers, residents, and others would benefit from enhanced experience in the district, naturally spawning increased demand for the goods and services of businesses in the area, which would drive greater parking revenue, and set off a virtuous cycle of economic gains.

This exact situation occurred in Old Town Pasadena, California, where the city transformed Colorado Boulevard from blighted to beautiful. Now that Old Town Pasadena is a premiere spot for shopping, dining, and living, the city is not considering removal of its metered parking and parking benefit cash distributions. Rather, it recognizes this scheme as central to the area's rebirth and plans to build success upon success. A *Los Angeles Times* story quotes a longtime property owner, who summarizes:

> This might seem silly to some people, but if not for our parking meters, it's hard to imagine we'd have the kind of success we're enjoying. They've made a huge difference. At first it was a struggle to get people to agree with the meters. But when we figured out that the money would stay here, that the money would be used to improve the amenities, it was an easy sell.[29]

Bend's downtown is currently beautiful and a premiere spot for commerce in Central Oregon; it can start from a position of strength and pick up approximately where Old Town Pasadena is now, while ensuring future improvement.

A useful alternative scenario - that is, what the future can be like if parking policies are not smartly reformed - is found not far from Pasadena, in Westwood Village, California. Around the same time Pasadena was first considering a shift to metered curb parking, Westwood Village was an established premier retailing destination. When Pasadena installed parking meters, Westwood Village did not. As Pasadena improved its proposition for retailers and consumers alike through increased spending on valuable public services, Westwood Village's infrastructure, public services, and experiential quality declined. Now, Old Town Pasadena is the premier destination, and Westwood Village simply is not.

---

[28] Such a value is based on the following. Downtown Bend has at least 225 curb parking spaces eligible for metering. Empirical evidence shows meters in Pasadena, California, generate an average of about $5 net revenue per day. If each of Bend's downtown curb parking spaces generated an average of $5 per day, annual revenue would exceed $410,000.

[29] Shoup, D. *The High Cost of Free Parking*, American Planning Association Planners Press (2011), quoting: Streeter, K., "Old Pasadena Thanks Parking Meters for the Change," *Los Angeles Times* (March 2, 2004).

In addition to the foregoing, it is useful to consider neighborhoods located nearby attractions that currently suffer from curb parking shortages and negative externalities from free parking for drivers. In Bend, due to its layout, there are many such places, including neighborhoods adjacent to downtown and Drake Park, areas near the NW Newport Avenue and NW Galveston Avenue corridors, and neighborhoods abutting parks, the river, or attractions in Midtown, to name a few. These areas presently suffer all the problems of street parking but enjoy no offsetting benefit. It is accordingly typical to hear complaints about parking in these areas from residents and drivers alike. Under a metered parking condition, these complaints would disappear since dynamically-priced parking would reduce over-congestion and generate new funds for the neighborhoods.[30] Funds could be put toward improved sidewalks, burying utility lines, or promoting other initiatives deemed important by each particular parking benefit district.

It has been shown that curb parking spaces in some neighborhoods can generate revenue in excess of property taxes paid by properties they front. If a curb parking space earns $5 net daily revenue (i.e., less than $0.70 per hour using an 8-hour day), annual revenue equals $1,780. Residential properties typically have street frontage for two or three curb parking spaces, implying revenue potential per residential property in the range of $3,560 to $5,340 per year - values that exceed property taxes for many homes in Bend. Thus, even a small share of these funds being earmarked for public use in metered areas could contribute to dramatically improved life quality for residents.

Here it is perhaps useful to note that, if only 5% of Bend's roughly 40,800 homes - that is, just over 2,000 properties - generated $3,560 per year (implying less than $0.70 per hour revenue on an 8-hour day, assuming two spaces per property), that would sum to about $7.5 million in new net revenue per year.

Pasadena, California; San Diego, California; Eugene, Oregon; London, England; and other cities have adopted policies that reflect the logic of parking benefit districts. Such approach is accordingly proven and successful.[31]

THE THREE PARKING REFORMS & CTAC'S GOALS

The proposed parking reforms directly address several of CTAC's stated goals. Here, we enumerate those goals and summarize some ways in which the proposed reforms support them.

1. **Reduce Congestion/Reduce Vehicle Miles Traveled.** Congestion results from too many vehicles attempting to traverse a given roadway at the same time. Decreasing vehicle miles traveled and/or redistributing VMTs across time reduce congestion. The policies proposed above do both.

[30] Metering technologies themselves need not be unsightly or consume significant space. Various meter types accommodate aesthetic concerns.

[31] Porter, "Public Comment: How Funding Needs & Transportation System Efficiency Respond to Funding Sources," (July 23, 2018).

First, by charging prices for parking, low-value VMTs are removed from the transportation system. Most directly, VMTs resulting from “cruising” for parking spaces are eliminated - an effect which, by itself, can reduce vehicle counts in high-traffic areas with curb parking by more than two-thirds on average. By selectively removing the lowest-value VMTs from roadways, total efficiency of the transportation system increases.

Second, with dynamic pricing, higher parking prices occur when demand for parking peaks, and lower prices are available at less popular times. This differential pricing causes price-sensitive consumers to shift when they drive and park, which helps redistribute VMTs more evenly across daily hours, reducing congestion.

Third, by encouraging infill developments, the elimination of minimum parking requirements enhances walkability and promotes modal substitution, which directly reduces VMTs. Similarly, as land use densifies due to reduced parking space excesses, car dependency declines and VMTs fall.

2. **Increase Travel Time Reliability.** For drivers, travel time reliability is a function of both congestion on roadways during travel to a destination and availability of parking once the destination is reached. The policies proposed above address both factors.

First, the policies reduce VMTs and redistribute VMTs to reduce congestion, thus enhancing travel time reliability.

Second, dynamic parking pricing helps ensure that convenient parking is available once the destination is reached. Drivers need not “build in” to their travel time budget a buffer for finding a parking space if an 85% occupancy rate is targeted with dynamic pricing.

3. **Facilitate Substantial Housing Supply and Economic Development.** Housing supply depends upon the motivation and ability to build housing among developers, while economic development reflects investment rates and capital freedom. Both housing supply and economic development are directly addressed by the proposed policies.

First, removed minimum parking requirements reduce housing development costs, which encourages higher housing build rates. It also encourages higher-density housing by lowering fixed costs associated with parking construction and land usage associated with parking spaces.

Second, as housing supply rises in total, the composition of that supply changes to reflect the removal of inequitable and regressive costs imposed on lower-income housing by minimum parking requirements. The type of supply most needed in Bend - specifically, higher-density, lower-priced housing - is accordingly the type that would be expected to experience the greatest supply growth.

Third, with respect to economic development, removal of minimum parking requirements enhances land use flexibility, releasing hostage value trapped in excess private parking spaces and enabling profitable redevelopment of blighted sites. Both forces unleash entrepreneurial creativity and capital, improving investment rates and enhancing the freedom of capital deployment.

Fourth, imposition of metered parking generates new revenue that, when distributed via parking benefit districts, generates higher living quality and encourages additional private investment. This effect is found in both commercial and residential districts.

4. **Generate Viable Funding.** Ideal funding sources for Bend's transportation system link revenue generation with system usage. This provides stability of funding and does not perversely incentivize excessive use of the transportation system (which increases funding needs) but rather discourages low-value use. The proposed policies provide for such funding.

First, metered parking generates revenue. Annual revenue well into the millions of dollars could be readily achieved in Bend, and a large proportion of that revenue would be paid by tourists.

Second, removal of minimum parking requirements and replacing those minimums with maximums provides the contours of a market for additional (i.e., above-maximum) parking spaces that could be paid by developers to Bend.

Third, empirical evidence shows that metered street parking enhances economic activity, which results in greater tax revenue. Implementation of parking benefit districts magnifies this effect.

Fourth, eliminating minimum parking requirements encourages business development and higher-density residences, both of which build the tax base.

ABOUT THE AUTHORS

Steve Porter

Steve is a recognized authority on economic analysis and valuation. He has provided expert testimony in high-stakes commercial litigation on topics including economics, valuation, statistics, econometrics, market definition, consumer choice, business strategy, and pricing, among others. He has consulted with Fortune 500 corporations on intellectual property licensing, asset transactions, and valuation issues, and he has conducted economic impact analyses, including work performed on behalf of the Los Angeles Superior Court. His articles have published in the *Journal of Legal Economics*, *les Nouvelles*, the *Patent, Trademark & Copyright Journal*, the *Journal of the Patent and Trademark Office Society*, and *Intellectual Asset Management*, among others. He also is co-author of *IP Strategy, Valuation, and Damages* (LexisNexis), a treatise on intellectual property economics. Steve has been an invited speaker before the Chicago Bar Association, the Attorney General's Office of the State of Arizona, and various law firms and corporations, where he has lectured on topics ranging from economic analysis and valuation to econometrics and game theory, and he has been quoted by and featured in the editorials section of the *Wall Street Journal*. Steve is a recipient of the William J. McKinstry Award in economics, the *Wall Street Journal* Scholar Award, the Micronomics Economic Research Award, and the IE Fund Leadership Scholar Award. He has served as a teaching assistant in economics at the Dolibois European Center in Luxembourg, an ad hoc referee for the *Journal of Forensic Economics*, and as Co-Chair and an Executive Committee Member of Young Professionals Advisory Council at the Farmer School of Business. Steve graduated *summa cum laude* and with University Honors from Miami University in Oxford, Ohio, completing dual majors in economics and marketing. He was granted his MBA, with honors by the Dean and Board of Academic Affairs, from IE Business School in Madrid, Spain, graduating 5th in a class of more than 400. Steve holds the Series 65 securities license.

Michelle Porter

Michelle is an expert in valuation, economic analysis, and quantitative methods. She has been engaged by Fortune 500 companies, SMEs, U.S. and international government entities, and leading law firms to provide expertise in high-stakes commercial litigations, negotiations, and asset transactions. Her consulting work has encompassed advisory roles in industries including pharmaceuticals, medical devices, banking, telecommunications, consumer goods, software, and transportation technologies, among many others. Michelle is co-author of the book entitled *IP Strategy, Valuation, and Damages* (LexisNexis). Her articles have appeared in *les Nouvelles*, *Intellectual Asset Management*, *Intellectual Property Magazine*, *Smart Business, Los Angeles Daily Journal*, *The Recorder,* and *China Intellectual Property*, and she has been quoted by *Forbes*. Michelle has spoken before such groups as the Intellectual Property Law Committee of the Chicago Bar Association, Google, and Motorola Mobility. Her work has been recognized with the Accenture International Consulting Competition Top Honors Award, the IE Women Leaders Scholarship Award, the *les Nouvelles* Best Article Award, and the Micronomics Economic Research Award. In addition, Michelle has served as an advisor to the Forte Foundation's MBALaunch for Women, President of the IE Business School Southern California Alumni Association, Co-Chair and Executive Committee Member of Young Professionals Advisory Council at the Farmer School of Business, and an instructor in microeconomics. Michelle graduated *cum laude* from Miami University in Oxford, Ohio, majoring in economics. She received her MBA from IE Business School in Madrid, Spain.