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Sales Tax Not Included: Designing Commodity Taxes for Inattentive Consumers

ABSTRACT. A spate of new research suggests that the salience of a tax dramatically shapes taxpayer behavior: the more salient a tax—i.e., the more prominent a good's after-tax price—the more taxpayers respond. Policymakers make decisions about tax salience, whether they intend to or not, every time they impose a new tax, yet the normative implications of those decisions remain poorly understood. This Note derives new guidelines for how policymakers can manipulate tax salience to promote efficiency. In particular, I show how levying a combination of high- and low-salience taxes can raise consumer welfare and further other social goals.

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INTRODUCTION

With the advent of behavioral economics, scholars have begun to grasp the complexity of forces that drive individual decisionmaking. A large body of research suggests that even small changes in a policy's design can dramatically affect how individuals behave in response to the policy, even when those design changes do not alter the incentives that individuals face.[1] Armed with this insight, prominent academics and policymakers have argued that governments should take such "behavioral" patterns into account when designing policy.[2]

This Note applies the insights of behavioral economics to an understudied area: the design of tax policy.[3] A series of recent studies suggests that, contrary to the assumptions of conventional tax analysis, the design of a tax significantly shapes taxpayer decisionmaking. These studies find that the more salient a tax is—that is, the more prominent a taxed good's after-tax price—the more consumers take the tax into account when making their purchasing decisions. The lower the salience of a tax, the less taxpayers pay attention and hence, the less they respond to changes in the tax's amount.

In this Note, I argue that the empirical evidence on tax salience has important implications for the design of tax policy. Manipulating the salience of a tax does not affect the substantive choices available to consumers—the salience of the tax does not affect a good's real after-tax price. But because salience affects individuals' consumption decisions, policymakers can manipulate this dimension of tax design to better control the effects of the taxes they impose. Put differently, my claim is that tax salience provides a new design lever that policymakers should use to promote efficiency and other social goals.

The recognition that policymakers should consider salience when setting tax policy is certainly important, but on its own it is not that useful. The challenge for policymaking lies in the next step: determining how salient a particular tax should be. Should taxes be fully salient, entirely hidden, or

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1. For a review of this research, see, for example, Christine Jolls, Cass R. Sunstein & Richard Thaler, *A Behavioral Approach to Law and Economics*, 50 STAN. L. REV. 1471 (1998).

2. *See, e.g.*, RICHARD H. THALER & CASS R. SUNSTEIN, NUDGE: IMPROVING DECISIONS ABOUT HEALTH, WEALTH, AND HAPPINESS (2008); Michael Grunwald, *How Obama Is Using the Science of Change*, TIME, Apr. 2, 2009, http://www.time.com/time/printout/0,8816,1889153,00.html.

3. By the "design" of tax policy, I mean the presentation to taxpayers of a good's after-tax price. *See* Aradhna Krishna & Joel Slemrod, *Behavioral Public Finance: Tax Design as Price Presentation*, 10 INT'L TAX & PUB. FIN. 189, 189-90 (2003) (exploring how tax policy can incorporate insights from marketing research on price presentation).

somewhere in between? And how should governments choose between these possibilities?

Whereas previous scholarship has focused on the binary choice between relying on high-salience versus low-salience taxes,[4] governments are not typically constrained to act in this all-or-nothing manner. Rather, policymakers may employ a combination of high- and low-salience taxes, with a different fraction of each being levied for every taxed good. To illustrate, consider the case of commodity taxation, where a central determinant of salience is whether the tax-inclusive price of a good is prominent at the time consumers make their purchasing decisions. The salience research suggests that consumers are more responsive to *posted taxes*—taxes that are included in a good's posted price— than to equally sized *register taxes*—taxes that are added when the consumer checks out at the register. Thus by manipulating the fraction of register and posted taxes levied on a good, policymakers can finely tune the extent to which consumers purchasing that good account for the taxes levied on it.

Once one recognizes that policymakers may fine-tune salience by using a combination of high- and low-salience taxes, a natural question arises: what degree of salience best promotes efficiency? That is, what combination of high- and low-salience taxes will raise some required amount of revenue while generating the minimum harm to consumers? On the one hand, a low-salience tax minimizes the traditional welfare costs of taxation by mitigating the tax's distortionary effects on consumers' purchasing behavior. But on the other hand, low-salience taxes generate new welfare costs by driving consumers to make mistakes. Identifying the efficient combination of high- and low-salience taxes involves trading off between these two competing effects.

This Note develops a number of new guidelines for how policymakers should manipulate tax salience in order to promote efficiency. Using a simple model of consumer behavior, I first derive a baseline formula for how policymakers should set tax salience when they have perfect control over the extent to which consumers account for a given tax. Within a broad range of circumstances, the formula highlights several important results: (1) fully

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4. *See* Brian Galle, *Hidden Taxes*, 87 WASH. U. L. REV. 59 (2009) (arguing that the desirability of hidden taxes depends on the cognitive mechanism by which taxpayers fail to pay attention); David Gamage & Darien Shanske, *Three Essays on Tax Salience: Market Salience and Political Salience*, 65 TAX L. REV. 19 (2011) (arguing in favor of low-salience taxes on the ground that their efficiency costs will be small in practice); Jacob Nussim, *To Confuse and Protect: Taxes and Consumer Protection*, 1 COLUM. J. TAX L. 218 (2010) (criticizing tax-inclusive pricing legislation on salience grounds); Hayes Holderness, Note, *Price Includes Tax: Protecting Consumers from Tax-Exclusive Pricing*, 66 N.Y.U. ANN. SURV. AM. L. 783 (2011) (calling for tax-inclusive pricing regulations to prevent consumers from making mistakes in the face of low-salience taxes).

salient taxes are never efficient; (2) fully hidden taxes are only efficient when demand for the taxed good is entirely insensitive to income; (3) high-salience taxes tend to be efficient for luxury goods and for goods that constitute a large share of consumers' expenditures; and (4) low-salience taxes tend to be efficient for goods that are easily substitutable. I then turn to the more practical question of how policymakers might implement the efficient degree of salience identified by the formula and show that utilizing a combination of high- and low-salience tax instruments offers one avenue for doing so. In addition to providing concrete guidelines, these results add important nuances to the existing legal scholarship on tax salience.[5]

Beyond promoting efficient taxation, policymakers can manipulate salience to further other social goals. Most notably, adjusting salience can affect the distribution of a tax's burden, both between producers and consumers, and between high- and low-income consumers. Additionally, Pigouvian taxes, which are *intended* to affect taxpayer decisionmaking, pose unique considerations for the choice of tax salience: high-salience taxes are more effective at altering taxpayer behavior but less effective at raising revenue. Because distributional considerations and behavior modification are sometimes important elements in the design of tax policy, I consider how policymakers should account for these factors when making design choices that affect a tax's salience.

Although much of my discussion will be theoretical, the question of tax salience is anything but abstract. Policymakers make decisions about a tax's salience — either intentionally or not — whenever a new tax is introduced. In particular, each new commodity tax can either be designed so that it is included in the taxed good's posted price or added on at the register. For example, many states have enacted or are considering enacting taxes on sugary soft drinks.[6] Such taxes can either be implemented by raising the sales tax rate on soft drinks relative to other food items or by taxing manufacturers, in which case the tax is passed on to consumers through an increase in soft drinks' posted price. Although this design choice shapes the salience of the tax — and hence its

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5. Most notably, Gamage and Shanske argue for a general presumption in favor of low-salience taxes on the basis of an empirical claim that consumers are likely to respond to low-salience taxes in a particular manner. *See* Gamage & Shanske, *supra* note 4, at 68-70; *infra* Subsection II.C.3. The efficient salience formula presented here generalizes Gamage and Shanske's presumption to the case in which consumers do not behave exactly as those authors assume. In particular, I show that the desirability of low-salience taxes depends on the properties of demand for the good being taxed. *See infra* Section II.A.

6. *Cf.* Michael F. Jacobson & Kelly D. Brownell, *Small Taxes on Soft Drinks and Snack Foods To Promote Health*, 90 AM. J. PUB. HEALTH 854 (2000) (surveying state taxes designed to discourage unhealthy eating).

effects on consumers' soft drink purchasing decisions—to my knowledge its consideration has been absent from the many discussions of the issue.

Similarly, a number of scholars have proposed instituting a national Value Added Tax (VAT) to help stem the growing federal deficit.[7] Like other consumption taxes, the VAT can be designed in high- or low-salience ways. For example, existing state sales tax systems may either be folded into the new VAT system or kept separate. This design choice (among others) has important implications for tax salience, yet despite the attention paid to VAT proposals by academics and policymakers in recent years, the salience aspect of the decision has received scant attention.[8] As this Note will argue, design choices that affect tax salience merit a larger role in discussions of tax policy.

Finally, apart from their practical implications for the design of tax policy, the results presented here speak to broader questions about the appropriate role of government in attempting to reduce its citizens' mistakes. In response to mounting evidence that individuals exhibit systematic cognitive biases when making important decisions, prominent behavioral law and economics scholars have argued in favor of designing institutions in ways that "debias" individuals to improve the quality of their decisionmaking.[9] Such interventions are appealing in the many circumstances in which decisionmakers exhibit cognitive biases, such as when taking out mortgages, choosing a prescription drug plan, or engaging in risky behaviors. However, my results demonstrate that in at least certain contexts, debiasing is actually counterproductive. In particular, I show that even when the government has the option of designing its tax system in a way that prevents taxpayers from making mistakes, taxpayers themselves are actually worse off when it chooses to do so. Thus in the case of commodity taxation, calls for debiasing deserve a skeptical look.

The remainder of the Note is organized as follows. Part I introduces the notion of tax salience and establishes the relationship between salience and efficiency. Part II constitutes the Note's primary contribution: I derive a formula that identifies the efficient degree of tax salience for a taxed good based on the nature of consumers' demand for that good. I also explain how policymakers can implement the efficient degree of salience by combining available taxes of varying salience. Part III turns from simple efficiency

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7. For examples, see Michael J. Graetz, *Taxes that Work: A Simple American Plan*, 58 FLA. L. REV. 1043 (2006), and sources cited in Nussim, *supra* note 4, at 225 n.31.

8. Indeed, the only scholarship I could identify discussing VAT design issues from a behavioral perspective is Galle, *supra* note 4, at 63; and Nussim, *supra* note 4, at 221.

9. *See, e.g.*, Christine Jolls & Cass R. Sunstein, *Debiasing Through Law*, 35 J. LEGAL STUD. 199 (2006).

considerations to factors left out of the efficient tax formula and explores how their inclusion changes the implications of the analysis.

I. BACKGROUND CONCEPTS

This Part reviews the conceptual foundations necessary to understand the results in Part II. I first review the empirical literature concerning tax salience and then turn to the link between tax salience and efficiency.

A. Tax Salience

The *salience* of a tax measures the prominence of a taxed good's after-tax price to consumers.[10] High-salience taxes are accessible to consumers—they are both noticeable and easy to process.[11] A *salience effect* occurs when consumers account more for high-salience taxes than for low-salience taxes when making their purchasing decisions. The presence of a salience effect suggests that taxpayers will adjust their behavior more in response to a high-salience tax than to a low-salience tax, even when both have exactly the same economic effect on the taxpayer's budget.[12]

A growing literature within behavioral economics suggests that salience effects may play an important role in shaping how individuals respond to taxation.[13] Two of the most important pieces of evidence that tax salience affects individual decisionmaking are reported by Raj Chetty, Adam Looney,

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10. Note that I define salience in terms of the prominence of the after-tax price, not in terms of the tax itself. Thus an excise tax typically has high salience because the amount of the tax is included in the posted price, even though consumers may not know how much of the price they pay is tax rather than producer price. This definition captures what Deborah Schenk refers to as "economic salience," Deborah H. Schenk, *Exploiting the Salience Bias in Designing Taxes*, 28 YALE J. ON REG. 253, 272-73 (2011), and what Gamage and Shanske refer to as "market salience," Gamage & Shanske, *supra* note 4, at 20.

11. Galle, *supra* note 4, at 62.

12. There is an important distinction between consumers who underreact to taxes due to salience and those who underreact due to lack of knowledge about the tax rate. If taxpayers remember that a tax exists, but are uncertain as to its size, they might account for the expected value of the tax. *See* David Weisbach, *Is Knowledge of the Tax Law Socially Desirable?* 8 (Univ. of Chi. Law Sch., John M. Olin Law & Econ. Working Paper No. 563, 2011), http://ssrn.com/abstract=1895572. However, Chetty, Looney, and Kroft present evidence suggesting that at least some of consumers' underreaction to taxes is likely due to a salience effect rather than to mere ignorance of the tax rate. Raj Chetty, Adam Looney & Kory Kroft, *Salience and Taxation: Theory and Evidence*, 99 AM. ECON. REV. 1145, 1165 (2009).

13. I summarize the literature here briefly. For a more thorough review, see Gamage & Shanske, *supra* note 4, at 26-54.

and Kory Kroft in their article *Salience and Taxation: Theory and Evidence*, describing an experiment and observational study that they conducted on the subject.[14] In the experiment, they investigated the hypothesis that consumers fail to incorporate the full sales-tax-inclusive price of a good when making purchasing decisions. The authors posted tags on a number of grocery store items, displaying the items' tax-inclusive prices.[15] They found that doing so — i.e., making the sales tax more salient — reduced demand for the taxed goods by eight percent.[16] These results suggest that absent such treatment, consumers were not fully accounting for the sales tax when deciding how much of a good to buy.[17]

In a separate study, Chetty, Looney, and Kroft investigated the importance of tax salience by analyzing state-by-state changes in beer consumption.[18] Beer is taxed in two ways in most states: through excise taxes, which appear in beer's posted price, and through sales taxes, which are typically added at the register.[19] By linking state and time variation in sales and excise tax rates to changes in a state's beer consumption, the authors were able to compare how consumers responded to excise and sales taxes.[20] The authors found that consumers reduced beer purchases significantly more in response to the high-salience taxes (the excise taxes) than to the low-salience taxes (the sales taxes).[21] More recently, these findings have been replicated in the context of cigarette taxation, at least for high-income consumers.[22]

In addition to comparing how consumer demand responds to high- and low-salience taxes, a number of authors have approached the subject from a different angle — investigating the extent to which the design of a tax affects

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14. Chetty et al., *supra* note 12.

15. *See id.* at 1150-52.

16. *See id.* at 1153-56.

17. One potential problem with this experiment, which the authors acknowledge, is the possibility of "Hawthorne effects." For example, it could have been the mere presence of the tags that deterred consumers from purchasing the tagged goods, rather than the heightened salience of the sales tax. *See id.* at 1146-47. The other studies described in this Part avoid this concern because they are observational in nature.

18. *Id.* at 1158-64.

19. *Id.* at 1158.

20. *Id.* at 1158-59.

21. *See id.* at 1164.

22. Jacob Goldin & Tatiana Homonoff, *Smoke Gets in Your Eyes: Cigarette Tax Salience and Regressivity*, 5 AM. ECON. J.: ECON. POL'Y (forthcoming Feb. 2013), http://dataspace.princeton.edu/jspui/bitstream/88435/dsp01wm117n99n/1/Goldin%20%26%20Homonoff%20IRS%20Working%20Paper%20August%202011.pdf.

consumers' awareness of and political support for the tax. In one such study, Amy Finkelstein investigated the role of salience in highway toll collection.[23] Electronic toll collection systems (e.g., E-ZPass systems) are less salient than traditional highway tolls because drivers do not need to carry or count the required cash. Finkelstein found that upon the adoption of an E-ZPass-style system, drivers' behavior became significantly less sensitive to changes in the toll rate, suggesting that the electronic toll collection system reduced market salience.[24]

Marika Cabral and Caroline Hoxby also investigated how salience affects behavior, focusing on the particular case of the property tax.[25] Some jurisdictions allow property taxes to be paid by escrow, so that the property tax is automatically deducted from taxpayers' bank accounts along with their mortgage payments. In those cases, the tax is less salient than when taxpayers must write separate property tax checks.[26] The authors found that property taxes were higher in jurisdictions that collected the tax in the escrow system, consistent with the idea that tax salience affects taxpayers' perceptions and reactions to the tax.[27]

In summary, a number of recent studies have investigated the role of tax salience in shaping taxpayer behavior. By comparing taxpayers' responsiveness to high- and low-salience taxes, these studies find that the less salient a tax is, the less consumers appear to take it into account when making their decisions. Although many of these empirical findings are quite recent, they appear to hold across a variety of contexts, suggesting that the phenomenon is not simply an artifact of a particular institution.[28] The remainder of this Note considers the normative implications of this line of research.

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23. Amy Finkelstein, *E-ZTax: Tax Salience and Tax Rates*, 124 Q. J. ECON. 969 (2009).

24. *Id.* at 986-90. Finkelstein also found that under such systems, toll-setting behavior becomes less sensitive to the local election calendar, suggesting a reduction in political salience as well. *Id.* at 1002-05.

25. Marika Cabral & Caroline Hoxby, *The Hated Property Tax: Salience, Tax Rates, and Tax Revolts* (2010) (unpublished manuscript), http://economics.stanford.edu/files/Hoxby3_2.pdf.

26. *Id.* at 2-4.

27. *Id.* at 38-39. The proposed mechanism underlying these findings is that that taxpayers are less likely to "revolt" against property taxes when they perceive the property tax burden to be lower than it really is.

28. Of course, I am not claiming that salience is equally important in all tax contexts. It seems less likely, for example, that the salience of the corporate income tax greatly affects corporate decisionmaking, given the large incentives that exist for firms to determine the optimal way to respond to the tax code. *See, e.g.*, Charles Duhigg & David Kocieniewski, *How Apple Sidesteps Billions in Taxes*, N.Y. TIMES, Apr. 28, 2012, http://www.nytimes.com/2012/04/29/business/apples-tax-strategy-aims-at-low-tax-states-and-nations.html.

B. Efficiency Analysis and Tax Policy

All commodity taxes make consumers worse off to some extent by transferring individuals' resources to the government.[29] Because the goal of a tax is to raise revenue for funding the government, the welfare loss that comes from this transfer is largely inescapable; even well-designed taxes cannot avoid it. However, most taxes also generate an *excess burden*—that is, they harm consumers over and above the amount strictly necessary to raise the revenue they take in.[30] The goal of efficient tax policy is to raise the needed amount of revenue while minimizing harm to taxpayers.

To understand why two taxes that take in the same amount of revenue can generate different welfare costs, it is crucial to understand the sources of excess burden. Commodity taxes generate excess burden by distorting consumers' decisions about which goods to purchase. When the government imposes a tax on a good, consumers respond by shifting their consumption away from the taxed good toward relatively cheaper alternatives. Consumers who substitute away from the taxed good do not contribute to the tax's revenue; but, having switched their consumption to a less desirable bundle of goods in order to avoid the tax, they are still worse off because of the tax. The larger these "avoidance costs," the greater the tax's excess burden.[31]

An example may help illustrate why taxes generate excess burden.[32] Suppose one thousand consumers in the town of Fruitsville decide each day whether to purchase an apple or an orange from their neighborhood fruit vendor. Both types of fruit cost $1, and the population's preferences are divided such that five hundred consumers buy oranges and five hundred buy apples.

Now suppose that the mayor of Fruitsville imposes a $0.10 posted tax on oranges (apples escape untaxed because of Fruitsville's powerful apple lobby),

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29. Assuming, of course, that the burden of the tax is not fully shifted to producers, and setting aside the benefits to taxpayers of the government services their taxes fund.

30. My presentation of excess burden is similar to other discussions of the topic. *See, e.g.*, Alan J. Auerbach, *The Theory of Excess Burden and Optimal Taxation*, *in* 1 HANDBOOK OF PUBLIC ECONOMICS 61 (Alan J. Auerbach & Martin Feldstein eds., 1985).

31. In the standard approach to welfare analysis, excess burden is identical to avoidance costs. As explained in Section II.C, *infra*, this identity ceases to hold once one accounts for the possibility of consumer mistakes.

32. To be clear, I am far from the first to use examples like this to explain the concept of excess burden. *See, e.g.*, HARVEY S. ROSEN, PUBLIC FINANCE 304-08 (7th ed. 2005).

bringing the after-tax price of an orange to $1.10.[33] Faced with the higher price, orange consumers are unhappy. Four hundred of them decide to keep buying oranges ("the Stayers") and shell out the extra dime each morning. But one hundred consumers stop buying oranges and start buying apples instead ("the Switchers").

What are the welfare costs of this tax? For the four hundred Stayers, the welfare cost of the tax stems from the extra income spent on their daily orange. As a group, the Stayers are collectively transferring $40 to the government each day. As such, they are worse off because they can no longer spend that money on other goods. This resource transfer from consumers to the government constitutes the *revenue cost* of the tax.

However, the Stayers are not the only ones harmed by the tax; the one hundred Switchers are worse off as well. Before the tax, each Switcher was faced with the choice of whether to pay $1 for an apple or $1 for an orange. Assuming the consumers in Fruitsville are rational, the fact that Switchers chose oranges in the pretax world implies that the members of that group prefer paying $1 for an orange to paying $1 for an apple. After the tax, the Switchers still pay $1 each morning, but instead of getting an orange, they only get an apple. Consequently, even though Switchers are not actually paying the tax, they are worse off because of it. This welfare cost to the Switchers constitutes the tax's excess burden.

The Fruitsville example illustrates a general principle of tax policy. When governments levy taxes that depend on behavior (such as whether one buys an orange or an apple), taxpayers will change their behavior to reduce their tax liability. This avoidance behavior creates a welfare loss to taxpayers over and above the revenue costs of the tax. The more avoidance behavior that a tax generates, the greater the excess burden of the tax will be. Thus, as a rule of thumb, policymakers concerned with efficiency seek to design taxes in ways that minimize the extent to which consumers substitute away from the taxed good.

C. Low-Salience Taxes and Efficiency

Until Chetty, Looney, and Kroft's seminal paper on the subject, economists lacked a suitable framework for investigating the efficiency properties of low-

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33. Because the tax is included in the posted price, it is fully salient to consumers. Readers concerned with such matters should assume appropriate elasticities for the full price to be passed through to consumers.

salience taxation.[34] This Section explains those authors' insights in a nontechnical way. After reviewing the basic relationship between tax salience and efficiency, I will be ready to turn to our central question: how should a government design its taxes to best exploit that relationship?

1. Efficiency Benefits of Low-Salience Taxation

The efficiency appeal of low-salience taxes stems from their potential to reduce avoidance costs. According to the empirical evidence described above, the lower a tax's salience is, the less consumers account for the tax when deciding how much of the taxed good to purchase. As a result, a low-salience tax induces less substitution away from the taxed good than does a high-salience tax of the same size. By reducing the salience of a tax—for instance by switching from an excise tax to a sales tax—governments can reduce avoidance costs by reducing the extent to which the tax distorts consumers' purchasing decisions.

To illustrate, return to the Fruitsville example and suppose that the city must raise $40 a day by taxing oranges. We saw that one way to achieve this goal was to levy a $0.10 posted tax on oranges. Such an approach would bring in the desired amount of revenue but would generate avoidance costs by motivating some consumers to switch to apples to avoid paying the new after-tax price of oranges. Suppose instead that the city chose to raise its revenue through a low-salience tax on oranges. For simplicity, we will assume that the new tax is completely hidden, in that consumers ignore the new tax entirely when deciding which fruit to purchase.[35] What are the welfare effects of the hidden tax?

Because consumers ignore the hidden tax, their consumption of oranges does not change once the tax is imposed (i.e., there are still five hundred consumers buying oranges after the tax is imposed). As a result, the size of the tax needed to raise a given amount of revenue is smaller than when the tax was designed in the high-salience way. Whereas raising $40 per day required a posted tax of $0.10, a low-salience tax of $0.08 raises the same amount.[36] Moreover, because the low-salience tax does not cause consumers to alter their fruit consumption, it does not generate any avoidance costs. Those who would

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34. *See* Chetty et al., *supra* note 12, at 1170-75.

35. The assumption that the tax is fully hidden is for ease of exposition. The qualitative story is unchanged as long as the tax is less than fully salient, i.e., as long as consumers fail to account for it fully when making their purchasing decisions.

36. For the high-salience tax: $0.10 * 400 = $40. For the low-salience tax: $0.08 * 500 = $40.

have switched from oranges to apples under the posted tax—and suffered as a result—still end up consuming their fruit of choice when the tax is hidden.

2. Efficiency Costs of Low-Salience Taxation

The analysis thus far suggests that low-salience taxes unambiguously improve efficiency. That conclusion would be correct under the standard framework of tax analysis. However, the traditional approach to efficiency analysis assumes rational behavior on the part of consumers, an assumption called into doubt by the empirical findings discussed in Section I.A. Unless one were prepared to believe that consumers actually care more about price increases that show up in the posted price than about price increases that are added at the register, the observed discrepancy in responsiveness between the tax designs suggests that consumers make systematic mistakes when deciding what to buy. Consequently, an approach to welfare analysis that assumes perfect rationality on the part of consumers is ill-suited for studying the choice between high- and low-salience taxes.

If one accepts that the attenuated consumer response to low-salience taxes reflects a mistake on the part of consumers rather than an intentional choice, the conclusions of the traditional approach to tax analysis no longer hold. In particular, low-salience taxes may reduce avoidance costs but still harm consumers by driving them to make mistakes when deciding which good to purchase. Thus, in addition to considering revenue and avoidance costs when assessing a tax's efficiency, one must also account for budgeting mistakes.

Back in Fruitsville, it is easy to see why low-salience taxes can generate budgeting mistakes. When the government imposed the posted tax on oranges, one hundred consumers switched from oranges to apples. Because the tax was fully salient, consumers fully accounted for oranges' higher after-tax price. Judging from the Switchers' behavior, we can draw two conclusions about the preferences of consumers in that group: first, Switchers prefer spending $1 on an orange to spending $1 on an apple. Second, Switchers prefer spending $1 on an apple to spending $1.10 on an orange.

Now consider the Switchers' behavior under the low-salience tax. Because they ignore the tax, the Switchers continue purchasing oranges: they end up spending $1.08 on an orange instead of spending $1 on an apple. This behavior constitutes a welfare cost to a consumer who would have chosen differently had she taken the low-salience tax into account. Put differently, a Switcher who accidentally spends $1.08 on an orange when she would have preferred spending $1 on an apple will benefit from having the orange instead of the

apple, but will suffer by having $0.08 less to spend on other goods.[37] Thus, the question of whether the high- or low-salience tax is more efficient for Fruitsville hinges on the relative magnitudes of the avoidance costs generated by the posted tax and the budgeting mistakes induced by the low-salience tax.

Again, the Fruitsville example illustrates a general point. Under the standard approach to tax analysis, the total welfare costs of a tax are given by the sum of revenue costs (resources transferred from consumers to the government) and avoidance costs (changes in consumer behavior made to avoid the tax).[38] Once one accounts for departures from rational decisionmaking, however, a new type of cost must be taken into account: budgeting mistakes. Thus for a tax that is less than fully salient, the total welfare cost is given by the sum of revenue costs, avoidance costs, and budgeting mistakes.

Table 1 summarizes the discussion so far by contrasting the welfare effects of high- and low-salience taxes. To isolate the efficiency effects, assume that the tax rates are chosen so that both designs bring in the same amount of revenue.

Table 1.

TYPE OF WELFARE COSTS GENERATED

		AVOIDANCE COSTS	BUDGETING MISTAKES	REVENUE COSTS
TAX DESIGN	High-salience	Large	Small	Equal for high- and low-salience tax designs
	Low-salience	Small	Large	

Table 1 highlights the efficiency tradeoff involved in choosing between a high- and low-salience tax design. Under a high-salience tax, consumers choose optimally when deciding how much of each good to purchase, but their propensity to substitute away from the taxed good generates avoidance costs. At the other extreme, a low-salience tax sidesteps the avoidance costs traditionally associated with taxation, but does so at the cost of driving consumers to make budgeting mistakes. Whether the high- or the low-salience tax does the better job of minimizing harm to consumers while raising the

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37. Of course, the other orange consumers who do not switch (the Stayers) will be strictly better off under the low-salience tax by virtue of the tax being $0.08 instead of $0.10.

38. *See generally* Auerbach, *supra* note 30.

required amount of revenue ultimately depends on the relative magnitudes of avoidance costs and budgeting mistakes associated with the taxed good.

II. FINE-TUNING TAX SALIENCE

Thus far, I have followed the literature by treating as binary the choice between high-salience taxes on the one hand and low-salience taxes on the other. In reality, however, policymakers are not constrained in this all-or-nothing way. Instead, they can manipulate a tax's design so that it is somewhere between fully salient and fully hidden. In particular, policymakers frequently enjoy both high- and low-salience methods for taxing a particular good. The greater the fraction of the tax imposed in the low-salience way, the less consumers will take the tax into account when making their purchasing decisions. This observation begs the question: how should the government choose among the various available tax instruments in order to best promote efficiency?

A. Identifying the Efficient Degree of Tax Salience

The qualitative discussion so far has highlighted a number of factors that influence the efficient degree of salience for a tax. Obtaining a precise answer to the efficiency problem, however, requires the use of a formal economic model.[39] Although I confine the mathematical details of the model to the Appendix, I provide an overview of the approach and discuss the main results here.

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39. The advantage of a formal economic model is that it allows one to analyze the costs and benefits of changing tax salience more systematically than has been attempted before. *See, e.g.*, Gamage & Shanske, *supra* note 4, at 68-69 (focusing on the case in which no trade-off exists because consumers fully account for the income effects generated by low-salience taxes); Nussim, *supra* note 4, at 242 (identifying the two opposing forces in the desirability of low-salience taxation, but concluding that "[t]hese two opposing effects on social welfare should be traded off, and hence no conclusion on price indication can be *a priori* correct").

    Chetty, Looney, and Kroft also utilize a formal economic model but do so to answer a different question than what I consider here. In particular, those authors extend the conventional formulas for tax incidence and excess burden to the case in which taxes are less than fully salient. *See* Chetty, et al., *supra* note 12. Whereas their results speak to the welfare costs of a tax with a given salience, I focus on an antecedent question: how salient to make the tax in the first place. More precisely, knowing the excess burden of a low-salience tax is not sufficient to determine what the efficient mix between high- and low-salience taxes should be. Computing the efficient mix requires the additional step of comparing a low-salience tax's excess burden against the excess burden that would be generated by a high-salience tax, accounting for differences in revenue generation between the two types of tax.

Consider a government that must raise a fixed amount of revenue by taxing some good X. Consistent with the empirical evidence described in Section I.A, I assume the presence of a salience effect: when making their purchasing decisions, consumers account more for high-salience taxes than for low-salience taxes. I define θ as the salience of the tax on X. That is, θ measures the degree to which consumers underreact to changes in the tax relative to changes in the posted price of X.[40] Thus when $\theta = 1$, the tax is fully salient. When $\theta = 0$, the tax is entirely hidden.[41]

As a starting point, suppose that the government has perfect control over the salience of its tax instruments, so that it may select any value of θ between 0 and 1.[42] The efficient degree of tax salience is the value of θ that makes consumers as well off as possible while raising the needed amount of revenue from taxes on X. I denote the efficient degree of tax salience by $\theta^{\star}$.

As shown in the Appendix, it turns out that under plausible assumptions,[43] $\theta^{\star}$ is given by a simple formula. For any good X, the efficient degree of salience

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40. For example, a tax has salience of 0.5 if consumers adjust their purchasing behavior by half as much in response to changes in the tax as they do in response to changes in the taxed good's posted price. Note that by employing the same parameter to describe both tax salience and taxpayer responsiveness, I am assuming the existence of a salience effect.

41. Depending on the specifics of how consumers make purchasing decisions, a tax that consumers entirely ignore could hypothetically be associated with a $\theta > 0$ (i.e., if the taxed good is the absolute last good purchased before running out of money). In practice, this possibility is unlikely to occur.

42. This setting, in which the government can precisely choose θ, is intended to be illustrative and should be taken as a baseline rather than a literal description of reality. After all, the government does not control θ directly; it can only adjust the design of a tax to make it more or less prominent to consumers. To precisely select θ, policymakers would need to know exactly how consumers would react to each possible tax design and have sufficient design choices available to span the range of θs between 0 and 1. I extend the analysis to a more realistic setting in Section II.B.

43. As Gamage and Shanske emphasize, the welfare implications of less-than-fully salient taxes will generally depend on exactly how consumers make their budgeting mistakes—for example, whether consumers purchase luxuries before necessities. Gamage & Shanske, *supra* note 4, at 66-67. However, I borrow a trick from Chetty, Looney, and Kroft: under the assumption that tax salience only affects consumers' well-being through consumption outcomes (rather than through tax design directly), one can conduct welfare analysis without making specific assumptions about consumers' budgeting process. Chetty et al., *supra* note 12, at 1148; *see also* Raj Chetty, *The Simple Economics of Salience and Taxation* 9-11 (Nat'l Bureau of Econ. Research, Working Paper No. 15246, 2009), http://www.nber.org /papers/w15246.pdf (describing this technique). I implement this approach in Section II.B and consider situations in which it might fail in Section II.C. Note that the assumption that taxes affect utility only through consumption is standard in the public finance literature. *See, e.g.*, Auerbach, *supra* note 30, at 65 (specifying agents' utility functions in terms of consumption).

for taxes on *X* depends on the nature of demand for *X*. More precisely, the formula for $\theta^\star$ balances the income and substitution effects associated with an increase in *X*'s price.[44] The efficient salience formula is given by:

$$\theta^\star = 1 - \frac{\varepsilon_c}{\varepsilon(1 - \omega_x \eta \tau)}$$

where τ denotes taxes as a share of *X*'s after-tax price, ω_x refers to the budget share of expenditures on *X*, η measures the income effect, ε_c measures the substitution effect, and ε reflects the sum of the income and substitution effects.[45]

In other words, the efficient degree of salience is given by a fraction in which the numerator measures the income sensitivity of *X* and the denominator reflects the income sensitivity plus the substitutability of *X*. The quantities that enter the optimal tax formula are frequently estimated for a range of goods, and so should be readily available to policymakers.[46]

Armed with the efficient salience formula and the appropriate empirical parameters, policymakers can calculate exactly what degree of salience best promotes efficiency for any given taxed good. Even in circumstances in which policymakers lack the exact data necessary to calculate $\theta^\star$, however, the efficient tax salience formula yields a number of important lessons about how salient taxes on a particular good should be.

First, fully salient taxes ($\theta = 1$) are never efficient. Although low-salience taxes harm consumers by causing budgeting mistakes, the welfare cost of those mistakes is trivially low when the tax is almost fully salient (e.g., $\theta = 0.99$). Intuitively, taxes that are close to fully salient only drive a small wedge between optimal and actual consumption, so that the marginal utility of income accidentally spent on the taxed good is still close to the marginal utility of income spent on other goods. Thus a government that relies exclusively on a

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44. Recall that a price increase is associated with both an income effect and a substitution effect. The income effect measures how a price increase in *X* affects total income and how that change in income affects how much *X* the consumer wants to buy. In contrast, the substitution effect measures how consumers substitute away from *X* following a price increase, holding income constant.

45. More precisely, η is the income-elasticity of *X*, ε is the uncompensated own-price elasticity of demand, and ε_c is the compensated (Hicksian) own-price elasticity of demand.

46. *See, e.g.*, Angus Deaton, *Estimation of Own- and Cross-Price Elasticities from Household Survey Data*, 36 J. ECONOMETRICS 7 (1987). One wrinkle is that the elasticity values that enter the efficient salience formula are evaluated at $\theta = 1$. For more on this point, see Jacob Goldin, *Optimal Tax Salience* 10 (Feb. 21, 2012) (unpublished manuscript), http://ssrn.com/abstract =2009108.

posted tax can always improve efficiency by slightly increasing the fraction of the tax added on at the register because the associated welfare loss of doing so will be trivially small.

This simple result has important policy implications. First, it provides a reason to be skeptical of tax-inclusive pricing regulations of the type common in Europe, which require retailers to display the full amount of the tax in the posted price that consumers observe. Although such regulations may potentially be justified on other grounds,[47] this result suggests that alternative policies might better promote efficiency. More broadly, this result suggests that even when a government has the ability to fully prevent consumers from making mistakes in this domain, it is generally not efficient for it to do so.

The second important result that follows from the efficient salience formula is that fully hidden taxes (θ = 0) are only efficient when demand for the taxed good is entirely insensitive to income.[48] Otherwise, policymakers can improve the efficiency of a fully hidden tax by slightly raising its salience. Again, the intuition is that very low-salience taxes generate very small avoidance costs—the marginal utility of consuming the untaxed good is close to the marginal utility of consuming the taxed good. Hence, when θ is close to 0, the efficiency gains from reducing budgeting mistakes will always dominate the accompanying small increase in avoidance costs.

These two results—that fully salient taxes are never efficient and that fully hidden taxes are only efficient in quite limited cases—suggest an important role for semi-salient taxation. Rather than rely entirely on a tax for which consumers fully account or fully ignore, policymakers can better promote efficiency by designing taxes that will have salience between those extremes.

A third implication of the efficient salience formula is that low-salience taxes are more efficient for goods that are easily substitutable (for example, apples and oranges in the Fruitsville scenario). Recall that the avoidance cost of a tax depends on two factors: first, the size of the tax, and second, the substitutability of the taxed good. Also recall that the welfare benefit of reducing a tax's salience is that it accommodates a reduction in the tax's size.

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47. *See infra* Part III.

48. In that case, an entirely hidden tax is efficient because it is equivalent to a lump-sum tax—the consumption bundle attained is the same under each. To see why, note that a lump-sum tax does not affect relative prices; it only decreases the consumer's income, which, by assumption, does not change the amount of *X* the consumer chooses relative to the pretax state. Similarly, by its definition, the imposition of a fully hidden tax does not change the amount of *X* the consumer chooses to purchase. Finally, the amount of income left over to spend on other goods is also the same in both cases—equal to pretax income minus the amount of the tax. Chetty et al., *supra* note 12, at 1173.

So the more substitutable the taxed good is, the larger the avoidance costs generated by the tax will be, and the greater the efficiency gains from reducing those avoidance costs by lowering the tax's size. Put differently, when the taxed good is highly substitutable, each reduction in tax size generates more "bang for the buck" in terms of the welfare gains that result.[49]

Fourth, high-salience taxes tend to be more efficient for luxury goods—i.e., when demand for the taxed good is highly sensitive to income.[50] When the government imposes a low-salience tax, consumption of the taxed good does not change much, but the amount spent on the good increases. A consumer in this position has less income to spend on other goods than before, but is still purchasing about the same amount of the taxed good. When demand for the taxed good is relatively insensitive to income, the resulting state of affairs is similar to what a fully rational consumer would choose to do if faced with a reduction in her income. In contrast, when demand for the taxed good is highly income elastic, the consumption allocation that the inattentive consumer ends up with is quite different than what a rational consumer would have chosen. As noted above, in the extreme case where demand for the taxed good is entirely insensitive to income, budgeting mistake costs are zero because the inattentive consumer's consumption is exactly equal to what a rational consumer would have chosen if faced with an equivalent reduction of income.

Finally, the efficient salience formula implies that high-salience taxes are efficient for "important" goods—goods that constitute a large share of consumers' total expenditures. Intuitively, the greater the proportion of their income consumers spend on the taxed good, the more that accidentally failing to substitute away from the taxed good will undermine their purchasing power, and hence, the more harmful the budgeting mistake will be. For example, gasoline typically constitutes a relatively large share of consumer

49. This result conflicts with the conclusion reached by Brian Galle, who writes that "hidden taxes are more likely to be welfare-increasing for inelastically demanded goods." Galle, *supra* note 4, at 81. One difference between our approaches is that Galle considers the presence of producer surplus, a possibility ruled out by my assumption of constant returns to scale. It is difficult to draw unambiguous conclusions about tax efficiency in the case of decreasing-returns-to-scale production technology, which is when producer surplus would occur. *See, e.g.*, Chetty, *supra* note 43, at 17 n.13 (noting that one cannot obtain an analytical expression for a low-salience tax's deadweight loss under non-zero producer surplus). The tension between the two approaches may also be smaller than it first appears due to a typographical error in Galle's text. *See* Galle, *supra* note 4, at 81 (using "inelastically" rather than "elastically" in the first paragraph on this page).

50. This result assumes that taxes are not a large fraction of the taxed good's pretax price. When taxes are very high relative to the pretax price, the efficient degree of tax salience may either be higher or lower for luxury goods. In such cases, one should determine optimal salience by using the optimal salience formula directly rather than relying on this rule of thumb.

expenditures and is relatively difficult to substitute (at least for consumers living in regions without substantial mass-transit alternatives to driving).[51] Consequently, policymakers should generally design gasoline taxes in relatively high-salience ways.[52]

In summary, the efficient salience formula provides a target for policymakers seeking to raise revenue in ways that will minimize harm to taxpayers. Calculating $\theta^\star$ for a particular taxed good does require information about demand for that good, but for many goods, the required parameters are frequently estimated. Even when the exact information needed to calculate $\theta^\star$ is unavailable, the formula still provides a number of useful guidelines about the types of goods for which relatively low-salience taxes will be most appropriate.

B. Combining High- and Low-Salience Taxes To Implement the Efficient Degree of Tax Salience

So far I have derived $\theta^\star$ assuming that the government enjoys perfect control over the salience of its tax instruments. In practice, however, governments lack this degree of control: even if policymakers could shape a tax's salience by manipulating its design, it is unlikely that they could do so with the precision needed to attain any arbitrary value of θ. But even without perfect control, a government often has access to two or more taxes that differ in their salience. For example, if a government seeks to tax purchases of some good X, it can usually do so either through a posted tax ($\theta = 1$) or through a register tax ($\theta < 1$). The key insight in this Section is that when the government has access to both a high-salience tax and a low-salience tax, it can replicate many of the efficiency benefits from manipulating salience directly by instead shifting the degree to which it relies on high- and low-salience designs.

More precisely, suppose that the government can levy two types of taxes on X to raise some required amount of revenue: a high-salience tax (t_h) and a low-salience tax (t_l). The two taxes are associated with salience values of θ_h and θ_l respectively, such that $0 \leq \theta_l < \theta_h \leq 1$. How should the government choose between the high- and low-salience taxes in order to best promote efficiency?

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51. U.S. Bureau of Labor Statistics, Consumer Expenditures in 2008, U.S. DEP'T OF LABOR (2010), http://www.bls.gov/cex/csxann08.pdf; Jonathan E. Hughes, Christopher R. Knittel & Daniel Sperling, *Evidence of a Shift in the Short-Run Price Elasticity of Gasoline Demand* (Nat'l. Bureau of Econ. Research, Working Paper No. 12,530, 2006), http://www.nber.org/papers/w12530.pdf.

52. This guideline is consistent with common practice, as gasoline taxes are typically incorporated into the posted price per gallon.

Should it rely fully on t_h, fully on t_l, or instead utilize a combination of the two? And if it utilizes a combination, how should it choose the fraction of each to rely upon?

It turns out that under similar assumptions to those employed in Section II.A,[53] the answer to these questions is given by a simple weighted average in which the government chooses how much to rely on each tax by comparing the salience of that tax to the efficient degree of salience for the good being taxed.[54] Formally, let ρ denote the fraction of taxes levied on X using the low-salience design, $\rho = t_l / (t_l + t_h)$. Define $\theta^\star$ to be the efficient degree of salience for a tax on X, using the same formula as before. Then the efficient degree of reliance on the low-salience tax is simply the value of ρ that solves the following equation:

$$\rho\, \theta_l + (1 - \rho)\theta_h = \theta^\star$$

To illustrate this result, suppose that a government decides to levy a tax on chocolate, and so must choose whether to include that tax in chocolate's posted price or whether to levy the tax when consumers check out at the register. Let us assume that the posted tax is fully salient ($\theta_h = 1$), and that the register tax has a salience of 0.5 ($\theta_l = 0.5$).[55] Finally, suppose that the estimates arrived at by researchers investigating the demand for chocolate imply that the efficient degree of salience for chocolate is $\theta^\star = 0.67$. Then the efficient tax salience formula suggests that the government should include one-third of the chocolate tax in the posted price and levy two-thirds of the tax at the register.[56]

The results in this Section show that even when policymakers lack perfect control over a tax's salience, they can still promote efficiency by strategically combining the various tax instruments at their disposal. In the next Section, I

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53. Indeed, my derivation of this result relies on weaker assumptions than the derivation of the efficient salience formula because I do not make assumptions about the specific order in which consumers purchase goods. *See* Goldin, *supra* note 46, at 5.

54. For a formal derivation of this result, see *id.* at 10-11.

55. Recall that a tax having a salience of 0.5 implies that consumers respond to a $1 increase in that tax in the same way that they respond to a $0.50 increase in the taxed good's posted price.

56. Combining high- and low-salience tax instruments to implement $\theta^\star$ requires different information than manipulating $\theta^\star$ directly because policymakers must know the salience of the available tax instruments. Even without knowing that information precisely, however, the result still provides a rough idea of which direction to move. For example, when $\theta^\star$ is very low, efficient tax design probably requires relying as much as possible on the low-salience tax, and one may be able to infer which tax is less salient even without knowing exactly how salient it is.

consider challenges that may arise when using this approach to implement the efficient degree of salience.

C. Challenges to Implementing the Efficient Degree of Tax Salience

1. The Efficient Degree of Tax Salience Might Be Outside the Range of Available Tax Instruments

In Section II.B I showed how policymakers can combine available tax instruments of fixed salience to mirror the efficiency of a single tax with salience $\theta^\star$. However, an immediate problem arises when the efficient degree of salience is not within the salience range of the available tax instruments—that is, when $\theta_h < \theta^\star$ or $\theta_l > \theta^\star$. For example, suppose that for some good X, we estimate that $\theta_l = 0.3$ and $\theta_h = 0.5$, and we compute that $\theta^\star = 0.25$. How should the government choose between the available tax instruments in such circumstances?

A straightforward option is simply for the government to fully rely on the available tax instrument with salience closest to $\theta^\star$. That is, when $\theta^\star$ is less than θ_l, the government would only utilize t_l for raising revenue from X. Intuitively, when the efficient degree of salience is lower than what is feasible, the government can best promote efficiency by setting salience as low as possible. Similarly, when $\theta^\star$ is greater than θ_h, the government could choose to rely entirely on t_h, making the tax as salient as possible.[57] Although this approach of choosing the highest or lowest salience tax available is certainly a reasonable course of action when $\theta^\star$ is outside of the $[\theta_l, \theta_h]$ range, other approaches that better promote efficiency will sometimes be available.

First, suppose that the government has access to subsidies in addition to taxes, which it can levy on purchases of X. Like taxes, subsidies can be designed in ways that have varying degrees of salience; to name a few examples (perhaps with declining degrees of salience), subsidies can be built into a good's posted price, added on at the register, or provided after the fact through income tax deductions or credits. In such cases, the government can implement $\theta^\star$ by combining taxes and subsidies instead of only relying on taxes.

To understand how a combination of taxes and subsidies can expand the range of attainable $\theta^\star$ values, note that a subsidy enters the efficient salience formula just like a tax, but with a negative sign. Thus policymakers may implement $\theta^\star$ by utilizing a subsidy in the same form as the available tax

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57. Because governments typically have access to posted taxes (which are fully salient), the problem of $\theta^\star < \theta_l$ is more likely to occur than $\theta^\star > \theta_h$.

instrument.[58] Simply solving the efficient salience formula for the case in which $\theta^\star$ is outside of the $[\theta_l, \theta_h]$ range allows one to calculate the tax-subsidy combination that best promotes efficiency. For example, when $\theta_l > \theta^\star$, the government can best promote efficiency by raising its revenue through a low-salience tax in conjunction with a high-salience subsidy.[59] In the numerical example described above, solving the efficient salience equation (allowing for subsidies) yields $t_l = -5t_h$; that is, the efficient combination is to set the low-salience tax at five times the amount of the high-salience subsidy.[60] Intuitively, the combination of the high-salience subsidy and the low-salience tax depresses the perceived price of the good even beyond what would be attainable using only a low-salience tax.

Another possibility for implementing $\theta^\star$ is that the government can redesign its existing tax instruments so that $\theta^\star$ falls within their range. When $\theta^\star < \theta_l$, this entails redesigning t_l (or a different tax) so that its salience declines. If the government had perfect control over the salience of its tax instruments, it would of course set θ_l exactly at $\theta^\star$ and rely on it alone; but even without perfect control, the government can still achieve $\theta^\star$ as long as it can reduce θ_l below $\theta^\star$ and then employ it in conjunction with t_h.[61] Even when the government cannot reduce θ_l all the way to $\theta^\star$, it can still improve consumer welfare through any reduction in θ_l because doing so brings the attainable degree of salience closer to $\theta^\star$.

How in practice can the government redesign its tax instruments to alter their salience? Brian Galle helpfully summarizes some possible approaches, many of which draw upon research from the marketing literature.[62] One possible way to reduce salience is to split a tax into multiple smaller charges, based on evidence that consumers tend to underestimate total prices when payments are split up into smaller parts.[63] Another option is to change the

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58. Of course, it is possible that similarly designed taxes and subsidies may have different degrees of salience because consumers do not treat taxes and credits symmetrically. In such cases, the appropriate salience value to use is that of the available subsidy instrument.

59. Because the subsidy reduces revenue, the value of the low-salience tax must be greater here than when no subsidy was present. Subsection II.C.2 discusses the possibility that taxpayers become more attentive as a tax's size increases. If so, the tax-subsidy combination approach may not be feasible for reaching very low values of salience.

60. Note that the low-salience instrument must be a tax rather than a subsidy because net revenue must be positive in order for the government to meet its revenue requirement.

61. Thus even when the government can employ differently salient taxes together, it is still quite valuable to learn more about how to design taxes in low-salience ways.

62. Galle, *supra* note 4, at 70-72; *see also* Krishna & Slemrod, *supra* note 3 (outlining the behavioral implications of various tax design choices).

63. Krishna & Slemrod, *supra* note 3, at 193-94.

timing of the tax—for example, by delaying its imposition until after a consumer has made the initial purchasing decision (perhaps by levying taxes through a "buy now, pay later" approach, or by adopting a tax regime in which taxpayers pay taxes on certain consumption expenditures well after the initial time of purchase). Finally, policymakers may be able to reduce a commodity tax's salience by imposing the tax in a complicated way—for instance, by incorporating it into the income tax. For example, one could imagine phasing out some other income tax credit or deduction in proportion to a consumer's expenditures on the taxed good. Although clearly quite speculative, these approaches highlight the range of policy tools through which governments might attempt to lower the salience of their tax instruments. The fact that such design changes may help policymakers achieve important efficiency advantages underscores the need for more empirical research in this area.

In summary, policymakers attempting to implement $\theta^\star$ may run into the problem that $\theta^\star$ is outside the range of salience associated with the available instruments. In certain cases, policymakers may surmount this problem by combining taxes and subsidies or by redesigning an available tax instrument to raise or lower its salience. When such options are not available, however, the next best approach will often be to rely fully on the tax with salience closest to $\theta^\star$.

2. Changing Attentiveness to Low-Salience Taxes

Thus far I have assumed that a tax designed with a given degree of salience is associated with a fixed level of consumer responsiveness. That is, by defining a tax's salience, θ, in terms of how much consumers adjust their demand in response to the tax, I have implicitly assumed that there is a constant mapping between the tax's design and the degree to which consumers account for it.

One might imagine, however, that consumers' attentiveness to low-salience taxes is not actually fixed, but rather varies in systematic ways. For example, one would expect a consumer to account more for a \$5 sales tax than for a \$0.05 one. More generally, the θ associated with a particular tax design may increase as policymakers rely more heavily on that tax for revenue.[64] If

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64. For example, such effects might emerge from what Galle refers to as intentional ignorance models, in which taxpayers account for low salience taxes if and only if the utility benefits of doing so outweigh the associated cognitive costs. Galle, *supra* note 4, at 81-82; *see also* Raj Chetty, Adam Looney & Kory Kroft, *Salience and Taxation: Theory and Evidence* 30-33 (Nat'l Bureau of Econ. Research, Working Paper No. 13,330, 2007), http://www.nber.org /papers/w13330.pdf (discussing a range of cognitive mechanisms that may give rise to observed salience effects).

consumers do tend to grow more attentive to low-salience taxes as governments rely more heavily on them, the efficiency benefits of raising such low-salience taxes would decline.

In thinking about the barriers that changing attentiveness to low-salience taxes poses to the implementation of $\theta^\star$, several points are important to keep in mind. First, the mere fact that the *salience* associated with a particular tax is changing does not affect the calculations for identifying the efficient degree of salience ($\theta^\star$). That is, changing attentiveness might affect one's strategy for implementing $\theta^\star$, but does not affect the target ($\theta^\star$) itself.[65] If consumers' attentiveness to the available tax instruments changes too quickly to achieve $\theta^\star$, that fact underscores the need for more research into methods of designing taxes in ways that consumers will ignore, even at high amounts.

Second, changing attentiveness to low-salience taxes might not interfere with the implementation of $\theta^\star$ if the changes are not too drastic. Unfortunately, there exists virtually no empirical evidence concerning the dynamic relationship between attentiveness to low-salience taxes and tax size. As long as attentiveness to the low-salience tax remains small enough to reach $\theta^\star$ at the level of the tax needed to satisfy the efficient salience formula, $\theta^\star$ can still be implemented in the normal way. If attentiveness to a particular tax does turn out to change too quickly to be useful in implementing $\theta^\star$, policymakers would have to employ a different tax instrument or settle for relying more heavily on the low-salience tax less than would otherwise be efficient. The fact that some researchers have found evidence consistent with a salience effect for large purchases[66] — for which the size of the tax is non-trivial — suggests that certain salience effects would persist for at least some increases in tax size.

Finally, policymakers could mitigate the problem of changing attentiveness to low-salience taxes by spreading such taxes out across different goods. If one

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65. However, closely related to changing attentiveness is the notion that low-salience taxes are associated with psychic costs, which would affect our conclusions about the desirability of implementing $\theta^\star$. Such issues are discussed *infra* in Section III.C.

66. *See, e.g.*, Kelly Sims Gallagher & Erich Muehlegger, *Giving Green To Get Green? Incentives and Consumer Adoption of Hybrid Vehicle Technology*, 61 J. ENVTL. ECON. & MGMT. 1 (2011) (documenting patterns consistent with a salience effect for hybrid automobile subsidies); Richard L. Ott & David M. Andrus, *The Effect of Personal Property Taxes on Consumer Vehicle-Purchasing Decisions: A Partitioned Price/Mental Accounting Theory Analysis*, 28 PUB. FIN. REV. 134 (2000) (reporting evidence that car purchasers failed to fully account for vehicle personal property taxes); Raj Chetty & Emmanuel Saez, *Teaching the Tax Code: Earnings Responses to an Experiment with EITC Recipients* (Nat'l Bureau of Econ. Research, Working Paper No. 14836, 2009), http://www.nber.org/papers/w14836.pdf (finding that providing personalized information about the tax consequences of the Earned Income Tax Credit schedule affected taxpayer behavior).

believes that a major factor associated with increasing attentiveness is the size of the tax itself,[67] collecting revenue from taxes on many goods could allow policymakers to keep taxes on each good relatively small, and hence attentiveness to each tax relatively low. Similarly, individuals' attentiveness to a particular tax likely depends on the share of their budget they devote to the taxed good.[68] Consequently, policymakers may be able to maintain low levels of attentiveness to low-salience taxes by levying such taxes on goods that make up a relatively small share of consumers' budgets.

3. Taxpayer Learning

Another factor that might limit policymakers' ability to implement $\theta^\star$ is the possibility that consumers would gradually account for low-salience taxes over time as they come to learn about their presence. However, there are at least two important limitations of this argument. First, although theoretically possible, as of yet there is no empirical evidence that such learning effects are important in practice; those who have investigated them have found no evidence of their presence.[69] Second, there is an important distinction between abstract knowledge of a tax—which consumers may become aware of over time—and accounting for that tax when making purchasing decisions. A tax that consumers know about may still have low salience if it is not prominent when consumers make their purchasing decisions. That is, a salience effect may persist for taxes that consumers know about in the abstract if, because they are not prominent, consumers do not consider them when making their purchasing decisions. The distinction between having knowledge of a tax and taking it into account at the time of purchase is bolstered by the research of Chetty, Looney, and Kroft, who present survey evidence that consumers are generally aware of sales tax amounts, even as they fail to account for them when deciding which goods to purchase.[70] When underreaction to taxes is driven by salience rather than lack of knowledge, there is no reason to expect that consumer learning will tend to raise a tax's salience over time.

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67. *See* Chetty et al., *supra* note 64, at 30-33.

68. That is, consumers are more likely to find it worthwhile to account for a low-salience tax that is levied on a large share of their purchases than for a low-salience tax that is only levied on a small share of their purchases. This claim can be derived formally from Chetty, Looney, and Kroft's "bounded rationality" model. *See id.* at 27-35.

69. Chetty et al., *supra* note 12, at 1163; Goldin & Homonoff, *supra* note 22, at 25. In fairness, it should be noted that these studies investigating taxpayer learning were not so conclusive as to definitively rule out such effects.

70. Chetty et al., *supra* note 12, at 1165.

A related type of consumer learning that might limit policymakers' ability to implement $\theta^\star$ involves consumers gradually accounting for the effects of low-salience taxes on their overall purchasing power, even while failing to account for the effects of the taxes on the ε prices of the taxed goods. Put differently, after a tax is imposed, consumers may gradually come to realize that they have less income by the amount of the tax, but still fail to consider the tax's effect on relative prices. That consumers might learn to account for low-salience taxes in this particular way was a possibility raised by Chetty, Looney, and Kroft[71] and subsequently embraced by Gamage and Shanske.[72]

If we accept Gamage and Shanske's claim that consumers are likely to account for the effect of low-salience taxes on their budgets, we can think of policymakers as being constrained by a lower bound on θ. Policymakers would not be able to reduce θ below the point at which consumers entirely ignore a tax's substitution effect but fully account for its income effect, a level of responsiveness we can call $\overline{\theta}$.[73] If Gamage and Shanske are correct, and consumers really do behave in this way, then as an empirical matter the salience of the available tax instruments could be no lower than $\overline{\theta}$. Because $\theta^\star$ is lower than $\overline{\theta}$,[74] policymakers would frequently find $\theta^\star$ to be outside the range of the available tax instruments, discussed above in Subsection II.C.1. In such cases, governments would be able to improve consumer welfare by combining low-salience taxes with high-salience subsidies, or by searching for ways to redesign taxes so that consumers fail to account for some of the tax's income effect.[75]

Finally, Gamage and Shanske admit that consumers may not fully learn to account for a tax's income effect when taxes are imposed on irregular purchases or when there are long delays between purchases and tax assessments. In such cases, the authors conclude that their argument for reducing market salience may no longer hold. However, even in such instances, the approach presented above remains valid: one can empirically measure the degree to which consumers respond to the low-salience tax (i.e., its θ), and from that

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71. Chetty et al., *supra* note 64, at 29.

72. Gamage & Shanske, *supra* note 4, at 68-69. Although certainly plausible, Gamage and Shanske's claims are somewhat speculative in that they lack empirical support.

73. Using the notation from Section II.B, $\overline{\theta} = (\omega_x \eta)/\varepsilon$.

74. This follows from the assumption that demand for the taxed good is not so sensitive that raising a fully salient tax would actually decrease revenue.

75. Of course, one might object that even such redesigns would eventually become high salience because of consumer learning. One potential approach for dealing with that possibility would be for the government to frequently adjust the sizes of its low-salience taxes, thus reducing the likelihood that consumers will learn to account for those taxes' income effects.

information combined with the efficient tax formula, compute the combination of available tax instruments that will best promote efficiency.

To summarize, this Part provided a formula to identify the efficient degree of salience for a taxed good and explained how governments can use the available tax instruments to bring about that target level of salience. For most governments, however, promoting efficiency is not the only goal of a tax system—other social priorities are important as well. The remainder of this Note discusses how policymakers should incorporate non-efficiency considerations when manipulating the salience of commodity taxes.

III. TAX SALIENCE AND OTHER SOCIAL GOALS

Thus far I have described how policymakers can identify the efficient degree of tax salience for a particular good—that is, the level of salience that raises the required amount of revenue while minimizing harm to consumers. The complications I have discussed above concern practical difficulties with implementing $\theta^\star$, but even with those difficulties, $\theta^\star$ remained the appropriate target; the question was only whether the target was feasible. In this Part, I discuss various considerations that should (in certain circumstances) cause policymakers' target salience to depart from $\theta^\star$.

A. Corrective Taxes

Section II.A derived the efficient degree of salience in the context of taxes designed to raise revenue. As discussed in that Section, efficient taxes are less than fully salient because lowering a tax's salience reduces the extent to which consumers change their behavior in response to the tax, thus lowering the tax's avoidance costs. Put differently, the efficiency advantage of low-salience taxation is that it alleviates the undesirable behavioral changes associated with taxes designed to raise revenue.

For an important class of commodity taxes, however, changing consumers' behavior is one of the tax's primary goals. For example, when some behavior generates harmful effects on others, governments can improve social welfare by imposing a so-called Pigouvian tax on the behavior that creates this externality, causing individuals to internalize the negative consequences of their decisions.[76] Similarly, governments may use taxes to influence behavior for paternalistic ends, such as cigarette taxes that aim to reduce the prevalence of

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76. *See, e.g.*, ROSEN, *supra* note 32, at 92-94.

smoking.[77] Whether the corrective tax is Pigouvian or paternalistic, the mechanism by which it achieves its goal is by prompting individuals to change their behavior. Additionally, because corrective taxes can bring in significant revenues, they are especially attractive to policymakers struggling to meet a budget. Thus corrective taxes often serve the dual goals of raising revenue and shaping taxpayers' behavior.

What degree of salience should policymakers aim for when the goal of a tax is to change behavior as well as raise revenue? On the one hand, the greater the fraction of the tax levied in a low-salience way, the less consumers will pay attention to the tax and the less they will adjust their behavior in response.[78] The same aspect of the low-salience design that was a benefit when the tax was intended to raise revenue constitutes a disadvantage when the tax is designed to alter behavior. For example, a cigarette tax imposed at the register will be less effective at reducing smoking than a tax included in cigarettes' posted price. As such, to the extent that changing behavior is the exclusive purpose of a tax, policymakers should design the tax so that as high a fraction as possible is presented in a high-salience way.

On the other hand, the more that policymakers impose a corrective tax in low-salience ways, the more revenue the tax will bring in. In general, when a government imposes a tax, consumers reduce their consumption of the taxed good. Because low-salience taxes reduce consumers' substitution away from the taxed good, a tax imposed in a low-salience way will bring in more revenue than a high-salience tax of equal size. To illustrate, a $0.10 cigarette tax raises more revenue when added at the register than when it is included in the posted price because consumers purchase fewer cigarettes when faced with the latter. For these reasons, the salience of a corrective tax plays an important role in shaping its relative effectiveness at raising revenue versus changing behavior.

Thus in the case of taxes designed to shape behavior, the simple formula for efficient taxation must be modified: a tax intended to affect taxpayers' behavior should have higher salience, all else equal, than a tax designed solely to raise revenue.[79] Inspection of an adjusted formula reveals that the basic

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77. *See, e.g.*, 35 ILL. COMP. STAT. 130/2 (Supp. 2012) (levying a tax on cigarette purchases). Of course, such taxes can often be justified on nonpaternalistic grounds as well. For example, cigarette smoking generates negative externalities in the form of secondhand smoke.

78. *See supra* Section I.A.

79. Finkelstein, *supra* note 23, at 979-80. In the presence of an externality, the formula for target salience becomes $\theta^{\star\star} = \theta^{\star} + \phi'(x)/((1 - \omega_x \eta \tau)(t_h + t_l)(\gamma))$, where $\theta^{\star\star}$ denotes the efficient degree of salience in the case of an externality, $\phi'(x)$ denotes the marginal social cost associated with the taxed good, γ is a parameter that reflects the curvature of the utility

properties of the efficient salience formula discussed in Part II carry through. The only difference is that the target level of salience should be greater than $\theta^\star$; how much greater depends on how much policymakers prioritize behavioral change over revenue collection.[80]

To illustrate the importance of tax salience in the corrective tax context, consider the case of "junk food" taxes. In response to soaring obesity rates nationwide, a number of public health advocates have called for states to adopt taxes on foods such as candy or soft drinks in order to promote healthier eating.[81] In light of many states' increasingly dire fiscal situations, the fact that these taxes have the potential to raise significant revenues makes them particularly appealing.

Implementing a tax on junk foods, however, requires confronting an important practical question: what form should the tax take? Junk food taxes may be designed in a number of ways, with varying degrees of salience. For example, many states exempt food items from their general sales tax or tax them at a lower rate. As such, one way to levy a junk food tax is to exclude targeted foods from the general sales tax exemption. In Connecticut, for example, most food purchases are exempt from the state's 6% sales tax rate, but soft drink purchases are not.[82] Similarly, in Illinois, most food items are taxed at 1%, but candy and soft drinks are subject to the general sales tax rate of 6.25%.[83] These sales tax exemptions have particularly low salience; the tax does not appear in the posted price and only affects purchasing decisions to the extent that consumers remember which foods are taxed and which are not.[84]

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functions, and $\theta^\star$ is computed as before from the efficient salience formula in Section II.A. Goldin, *supra* note 46, at 14.

80. *See* Finkelstein, *supra* note 23, at 979-80. It is interesting to note that the approach prescribed here concerning corrective taxes appears generally consistent with the way many taxes are set in practice. Most commodities are only subject to sales taxes. *See State Comparisons*, FED'N OF TAX ADM'RS, http://www.taxadmin.org/fta/rate/tax_stru.html (last updated Jan. 1, 2012). This makes sense assuming that the efficient degree of salience for those goods is less than the salience of the sales tax, and that the sales tax has the lowest salience of any available tax. On the other hand, goods that are subject to excise taxes (which have higher salience) include cigarettes, alcohol, and gasoline, *id.*—all goods that generate externalities or for which policymakers may have paternalistic concerns.

81. *See, e.g.*, Kelly D. Brownell & Thomas R. Frieden, *Ounces of Prevention—The Public Policy Case for Taxes on Sugared Beverages*, 360 NEW ENG. J. MED. 1805 (2009).

82. CONN. GEN. STAT. § 12-412(9) (2011).

83. 35 ILL. COMP. STAT. ANN. 105/3-10 (2005).

84. To illustrate, it might be helpful for readers to ask themselves how much sales tax is owed on a $1 bottle of soda in their home states. My experience presenting this research suggests that even many tax scholars are not too confident in their answers. Remembering which goods are covered by the tax can be harder than it appears. In Illinois, for example, candy is

Consequently, one would expect that junk food taxes designed in this manner would be more effective at raising revenue than at reducing obesity.[85]

Instead of manipulating the general sales tax exemption on food, states may also tax junk foods through excise taxes on manufacturers or retailers. For example, Arkansas imposes a tax of $2 per gallon of soft drink syrup,[86] and Tennessee levies a tax of 1.9% of gross receipts on soft drink manufacturers.[87] Because these excise taxes are passed on to consumers through changes in the posted price of the taxed foods, they are fully salient. Thus implementing a soft drink tax as an excise tax would likely be more effective at reducing the consumption of unhealthful foods but less effective at raising revenue.

Although proposals for taxing junk food have received considerable attention, the question of how salient such taxes should be has been largely neglected.[88] What the above discussion indicates is that this neglect is unfortunate, as the question of the tax's salience plays a central role in determining how effective it will be at reducing obesity and raising revenue. In particular, the analysis here suggests that levying a greater fraction of the tax through a posted tax design will be more effective at reducing unhealthy food intake, whereas relying more heavily on a sales tax exception will bring in more revenue. Regardless of which goal policymakers decide to prioritize, recognizing the importance of salience will allow taxes to be better tailored toward their intended objectives.[89]

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defined to exclude food products containing flour, so that caramel-coated popcorn is taxed but a Kit-Kat bar is not. *Id.*

85. This hypothesis finds some support in the empirical literature. *See, e.g.*, Jason M. Fletcher, David Frisvold & Nathan Tefft, *Can Soft Drink Taxes Reduce Population Weight?*, 28 CONTEMP. ECON. POL'Y 23 (2010).

86. ARK. CODE ANN. § 26-57-904(a)(1) (2012).

87. TENN. CODE ANN. § 67-4-402 (2012).

88. Some proponents have argued for a posted tax on grounds other than salience as well. *E.g.*, Brownell & Frieden, *supra* note 81, at 1807 (arguing for an excise tax on sugary soft drinks both on salience grounds and because excise taxes are fixed based on quantity of beverage rather than register price). Others have argued that either a posted or a register tax would be desirable. *E.g.*, Carolyn L. Engelhard, Arthur Garson, Jr. & Stan Dorn, *Reducing Obesity: Policy Strategies from the Tobacco Wars*, URB. INST. 23-25 (2009), http://www.urban.org /UploadedPDF/411926_reducing_obesity.pdf.

89. It would be wrong to conclude from the above discussion that low-salience taxes can never be effective in shaping behavior. As Section III.B will argue, it may often be the case that low-salience taxes are more noticeable for low-income consumers. This observation is important here because many corrective taxes aim particularly at shaping the behavior of low-income consumers. In the case of junk food taxes for example, low-income communities are among the most affected by obesity, which is associated with such diseases as Type 2 diabetes and heart disease. *See* Pub. Health Serv., *The Surgeon General's Call to*

B. Distributional Effects of Tax Salience

My focus so far has been on how policymakers can manipulate salience to minimize the burden of a tax on consumer welfare. However, an important concern with many commodity taxes is not only their effect on the welfare of the average taxpayer, but the distribution of their burden across taxpayers of different income groups. If a tax's salience affects not only its efficiency, but also the distribution of its burden, policymakers concerned with equity should take distributional effects into account when choosing a target level of salience.[90]

Should policymakers concerned with equity design taxes with salience higher or lower than $\theta^\star$? Answering that question requires understanding the relationship between tax salience and regressivity. Unfortunately, the existing legal scholarship has come to mixed conclusions, with most authors acknowledging that it is theoretically possible for low-salience taxes to either increase or decrease regressivity.[91] In this Section, I explain the mechanisms by which salience can affect tax regressivity and briefly discuss new empirical research that sheds light on the matter.

To understand the basic mechanism by which low-salience taxes can affect regressivity, consider a government that must raise a fixed amount of revenue by taxing a particular good and must decide how salient to make taxes on that good. Suppose that there are two groups of consumers: attentive ones (who fully account for low-salience taxes) and inattentive ones (who do not fully account for low-salience taxes). If the government imposes a high-salience tax, both attentive and inattentive consumers will respond to it, reducing their demand for the taxed good accordingly. As in the standard case, this reduction

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Action To Prevent and Decrease Overweight and Obesity, U.S. DEP'T HEALTH & HUM. SERVS. 13-14 (2001), http://www.surgeongeneral.gov/library/calls/obesity/CalltoAction.pdf. If low-income consumers, compared to high-income consumers, are relatively responsive to low-salience taxes, then low-salience taxes may be able to bring about most of the desired changes in behavior while still raising large revenues from the high-income consumers who fail to take the tax into account.

90. Louis Kaplow has forcefully argued that policymakers should focus primarily on efficiency considerations when designing social policy and address distributional concerns through adjustments in the income tax. *See* LOUIS KAPLOW, THE THEORY OF TAXATION AND PUBLIC ECONOMICS (2008). Indeed, Gamage and Shanske rely on this reasoning in suggesting that one should focus primarily on efficiency considerations rather than distribution in assessing the desirability of salience changes. Gamage & Shanske, *supra* note 4, at 74-78. However, it seems unlikely that the result (the Atkinson-Stiglitz theorem) underlying Kaplow's claim would extend to the case in which commodity and income taxes were differently salient because its derivation assumes perfect optimization on the part of consumers.

91. *See, e.g.*, Galle, *supra* note 4, at 100-04; Nussim, *supra* note 4, at 246-47.

in demand requires the government to raise the tax rate high enough to bring in the needed amount of revenue.

Consider now what happens if the government imposes a low-salience tax instead. In that case, only attentive consumers will reduce their demand for the taxed good. Inattentive consumers will continue consuming the good as before. Consequently, the reduction in aggregate consumer demand that typically accompanies a tax increase will be attenuated. As a result, the government will need to raise the tax rate less than in the high-salience case in order to bring in the needed amount of revenue; the final magnitude of the tax will be lower when the tax is low-salience than when it is high-salience. Because their income goes further when tax rates are lower, attentive consumers will be strictly better off under the low-salience tax.[92]

What does this result mean for regressivity? Reducing the salience of a tax redistributes its burden from attentive to inattentive consumers. The crucial question is thus whether high- or low-income consumers are more attentive to low-salience taxes. That is, low-salience taxes will be less regressive than high-salience taxes if low-income consumers are more likely than high-income consumers to take low-salience taxes into account when making purchasing decisions. In contrast, when high-income consumers are more attentive to low-salience taxes, reducing the salience of a tax will exacerbate its regressivity.

It is by no means obvious which income group is likely to be more attentive to low-salience taxes. In his recent article, Brian Galle hypothesizes that high-income consumers tend to be more attentive to hidden taxes because they have more education and better resources for avoiding cognitive errors than lower-income consumers do.[93] Although Galle's argument is certainly plausible, it seems likely that this reasoning applies most strongly to contexts such as an income tax, where calculating an activity's tax consequences is a complicated matter and high-income consumers are able to afford expensive accounting and tax planning services to which low-income consumers lack access. Another factor suggesting that high-income consumers might find it worthwhile to be more attentive is simply that they tend to spend more on most goods and consequently stand to lose more by misallocating their income through budgeting mistakes.[94]

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92. Inattentive consumers might be better off as well, but the benefits from facing the lower tax will be offset by the budgeting mistakes that the low-salience tax prompts them to make. *See* Goldin & Homonoff, *supra* note 22, at 4-10.

93. *See* Galle, *supra* note 4.

94. Another important factor that might push high-income consumers to be more attentive for some goods is the fraction of their budget spent on the good in question. *See* Goldin &

In the context of commodity taxation, however, there are also good theoretical reasons to expect low-income consumers to be more attentive than high-income consumers to low-salience taxes. In particular, the cost of ignoring a sales tax is typically only a few dollars that could have been spent on other goods. Because the marginal utility of income declines with wealth, however, the value of those few dollars will be much greater for lower-income consumers than higher-income ones. Hence, lower-income consumers have a much greater incentive to take the sales tax into account when making purchasing decisions. Moreover, although low-income consumers tend to be less educated than their high-income counterparts,[95] it seems likely that many have the skills necessary to take (an approximation of) the sales tax into account.

Recent empirical findings also lend support to the claim that low-income consumers tend to be more attentive to low-salience taxes in at least one context. In a recent work, Tatiana Homonoff and I investigated income differences in consumer attentiveness to low-salience cigarette taxes.[96] Cigarettes are taxed in two ways in the United States: through an excise tax, which is included in cigarettes' posted price, and through a sales tax, which is typically added on when consumers check out at the register. By linking survey data on individuals' cigarette consumption to cigarette excise and sales tax rates, we investigated whether high- and low-income consumers responded differently to changes in the two types of taxes. Whereas both high- and low-income consumers responded to cigarette excise tax changes (which are fully salient), only low-income consumers reduced cigarette consumption following increases in the sales tax on cigarettes (which are less than fully salient). These results are consistent with the hypothesis that attentiveness to low-salience cigarette taxes declines as income increases. Hence, at least in the case of cigarettes, concern for reducing a tax's regressivity may well prompt policymakers to aim for a target level of salience below $\theta^\star$.[97]

Homonoff, *supra* note 22, at 35-38 (setting out a formal framework for considering whether attentiveness to a low-salience commodity tax increases or declines with income).

95. *See generally* CLAUDIA GOLDIN & LAWRENCE F. KATZ, THE RACE BETWEEN EDUCATION AND TECHNOLOGY (2008).

96. Goldin & Homonoff, *supra* note 22.

97. One final situation in which low-salience taxes may end up benefitting low-income taxpayers occurs in the context of refundable income tax credits, such as the Earned Income Tax Credit (EITC). (I owe this example to James Mahon.) The EITC works by effectively supplementing the wages earned by qualifying low-income taxpayers. Although the tax credit is designed to benefit low-income employees, some research indicates that it is actually taxpayers' *employers* who end up capturing much of the program's benefits; a taxpayer will be willing to accept a job for a lower wage if she knows that the wage her employer pays her will be supplemented through a government program. Jesse Rothstein,

In addition to distributional issues that arise between consumers of different incomes, a tax's salience also affects the distribution of its burden between consumers and producers.[98] To illustrate, suppose that the government imposes a posted tax on soda purchases by consumers. Because the tax is fully salient, traditional economic models of taxation imply that soda's pretax price will decline so that producers and consumers share the burden of the tax.[99] If, however, the tax is less than fully salient, consumers are less driven to substitute away from soda, and as a result, soda producers are not forced to reduce the pretax price of soda by as much in order to maintain demand. Thus the more salient a new tax is, the more its burden will fall on producers.[100] Because the ultimate incidence of taxes borne by producers depends on the relative importance of the factors of production used to produce the taxed good, here too the effect of tax salience on progressivity is likely to vary from good to good.

So far, I have argued that lowering the salience of a commodity tax shifts the tax's burden from producers to consumers, and from attentive consumers to inattentive ones. Thus even if one accepts that low-income consumers are more attentive than high-income ones, the question remains whether reducing tax salience lessens the burden on low-income consumers, or whether those effects are more than offset by the shifting of the tax's burden from producers to all consumers.

By combining the mechanisms discussed in this Section into a single model, it is straightforward to show that reductions in tax salience are most likely to benefit attentive consumers when the supply of the taxed good is relatively sensitive to price.[101] To understand this result, recall that the more

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The Unintended Consequences of Encouraging Work: Tax Incidence and the EITC (Ctr. for Econ. Policy Studies, Working Paper, 2008), http://www.princeton.edu/gceps/workingpapers /165rothstein.pdf. When the tax benefit is low salience, however, the taxpayer is less likely to consider it when deciding whether to accept a job, and as a result, her employer may be forced to pay a higher wage.

98. Chetty et al., *supra* note 12, at 1169.

99. The amount by which the pretax price declines in response to a new tax depends on the relative sensitivity of demand and supply of the taxed good. *See, e.g.*, Don Fullerton & Gilbert E. Metcalf, *Tax Incidence*, *in* 4 HANDBOOK OF PUBLIC ECONOMICS 1787 (Alan J. Auerbach & Martin Feldstein eds., 2002).

100. Note, however, that the distributional effects of tax salience manipulations will only affect the incidence of the tax between consumers and producers for goods when the incidence of the tax is not fully passed on to consumers. That is, when producer supply is substantially more elastic than consumer demand, the tax will already fall completely on consumers and reductions in salience will not matter.

101. The precise condition required is that $\tau\varepsilon_s > 1$, where ε_s denotes the price-elasticity of supply for the taxed good. Goldin & Homonoff, *supra* note 22, at 36.

price-sensitive the supply of a good is, the more taxes on that good are passed on to consumers through increases in the pretax price.[102] In contrast, when the supply of a good is relatively inelastic, producers must absorb high-salience taxes on that good. In such cases, replacing a high-salience tax with a low-salience one (to which some consumers are inattentive) allows producers to shift some of the tax's burden back onto consumers, increasing the after-tax price faced by attentive and inattentive consumers alike. Thus low-salience taxes offer the best chance of progressivity when the supply of the taxed good is relatively sensitive to price.

In summary, salience shapes the distribution of a tax's burden in two important dimensions: between producers and consumers collectively and among consumers who differ in their attentiveness to low-salience taxes. When low-income consumers are more attentive to low-salience taxes, policymakers concerned with equity should choose a target level of salience below $\theta^\star$ in order to increase the tax's progressivity. On the other hand, when low-income consumers are *less* attentive to low-salience taxes, policymakers should err on the side of relying more heavily on high-salience taxes. Although these prescriptions are straightforward, they can only be implemented for a particular good once policymakers understand whether attentiveness to low-salience taxes on that good is increasing or decreasing in income. For this reason, it is clear that more empirical work is needed in this area.

C. Psychic Costs Associated with Low-Salience Taxes

In addition to externalities and distributional concerns, another factor that policymakers should consider before implementing $\theta^\star$ is the possibility that low-salience taxes might generate direct psychic costs to the consumers who face them. For example, a consumer might suffer disutility from engaging in the mental calculation required to account for a sales tax, when that calculation could have been avoided if the tax had been included in the good's pretax price instead.[103] If such psychic costs are important, the value of $\theta^\star$ that emerges from the efficient tax formula will be too low; that is, by neglecting a cost

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102. *See* Fullerton & Metcalf, *supra* note 99, at 1797.

103. For a discussion of a model that considers such costs, see the bounded rationality model in Chetty et al., *supra* note 64, at 27-35. An additional consideration comes about when one considers imposing low-salience taxes of differing amounts on each taxed good, as the efficient salience formula implies. In that case, consumers who choose to account for all such taxes may face an additional burden not only because they must account for the low-salience tax, but also because they must remember which tax rate is levied on which good.

associated with low-salience taxes, the formula suggests that policymakers should try to lower salience more than is actually desirable.[104]

The failure of the efficient tax formula to account for the possibility that such psychic costs are associated with low-salience taxes certainly constitutes a limitation of the model. However, several factors may limit the practical importance of this omission.

First, the mere presence of a salience effect does not imply the existence of psychic costs. Consumers may fail to account for low-salience taxes even when the computational costs of doing so are negligibly small, such as when an individual's failure to account for a low-salience tax is unintentional, or is intentional but irrational.[105]

A second possibility is that low-salience taxes may actually be associated with substantial psychic costs, but because of those costs, boundedly rational decisionmakers choose to ignore the tax when making their purchasing decisions.[106] In such cases, the consumer will suffer no direct utility costs when faced with the low-salience tax, and the efficient salience formula will continue to apply.

Finally, even when consumers do suffer direct psychic costs when confronted with a low-salience tax, Chetty, Looney, and Kroft show that the magnitude of those costs may well be quite small. That is, because of the nature of the costs and benefits of accounting for low-salience taxes, relatively small psychic costs can motivate substantial inattention on the part of consumers.[107] Consequently, omitting such costs from the efficient salience formula may be less misleading than one would otherwise believe.

D. The Democratic Legitimacy of Implementing $\theta^\star$

One final objection that might be raised against a government implementing $\theta^\star$ is that low-salience taxes are fundamentally undemocratic, in

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104. Chetty et al., *supra* note 12, at 1171 (noting that the excess burden formulas they derive are exclusive of increases in cognitive costs). A related issue is the distribution of these psychic costs. If lower-income consumers are more likely to choose to suffer these costs to avoid misallocating their budgets, then the incidence of these costs could well be regressive.

105. *See* Galle, *supra* note 4, at 81-85 (exploring how taxpayer decisions to neglect low-salience taxes may arise from nonrational behavior).

106. By boundedly rational decisionmakers, I mean individuals who account for the low-salience tax when the utility of avoiding the budgeting mistake exceeds the disutility of taking the tax into account. *See* Chetty et al., *supra* note 64, at 27-35.

107. More precisely, the argument is that the utility loss from ignoring low-salience taxes is second order with respect to the tax's size. Chetty et al., *supra* note 12, at 1165.

that they allow policymakers to escape accountability for the taxes they impose.[108] In addressing this objection, it is important to distinguish between *political salience* — that is, the extent to which taxes elicit a political response on the part of taxpayers — and *market salience* — the aspect of tax design that affects economic decisionmaking.[109]

Although the focus of this Note has been on market salience, my results also speak to the legitimacy of low-salience taxes from a democratic theory perspective. First, fully informed taxpayers may prefer and vote for taxes that are less than fully salient. In particular, consumers themselves are generally better off when taxes are designed in a way that encourages them to make some mistakes.

Second, it is political — not market — salience that matters for political transparency and accountability. Taxes with low market salience can have high political transparency, and vice-versa. For example, a sales tax has low market salience because it is not prominent when consumers choose which goods to buy, but it probably has high political salience because voters are reminded of its presence every time it is separately added at the register. In contrast, an excise tax has high market salience — it shows up in the posted price — but low political salience because consumers are rarely presented with the size of the tax. Hence the low-market-salience sales tax may end up being more politically transparent than the high-market-salience excise tax. As such, manipulating tax salience in ways that foster efficient tax policy is unlikely to be an effective strategy for a government seeking to mislead its citizens.[110]

CONCLUSION

Policymakers make decisions about tax salience — whether they intend to or not — every time they levy a new tax. In light of the mounting empirical evidence that such choices have real effects on taxpayers' behavior, this Note

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108. A related objection is the notion that *any* attempted government intervention in the decisionmaking of its citizens is paternalistic and inherently undemocratic. Such issues are far outside the scope of this Note.

109. *See* Gamage & Shanske, *supra* note 4, at 54-58; Schenk, *supra* note 10, at 272.

110. A related point is that consumers may still have knowledge of low-salience taxes — and consider them when voting in elections — even when they are not prominent at the time that purchasing decisions are made. *See* Chetty et al., *supra* note 12, at 1165. For much more on the question of the legitimacy of low-salience taxes from a democratic theory perspective, see Gamage & Shanske, *supra* note 4, at 79-98, which criticizes arguments in favor of high political salience; and Schenk, *supra* note 10, at 297-99, which argues that taxes with low political salience are justified given that they constitute a politically palatable means of reducing staggering deficits.

has called for increased attention to salience in the design of commodity taxes.[111] Whereas previous legal scholarship has focused on the all or nothing choice between high- and low-salience tax designs, I argued that the most efficient policy is generally to *combine* high- and low-salience taxes. In particular, I derived a straightforward formula for the efficient combination of high- and low-salience tax instruments and explored how the efficient solution varies depending on the characteristics of the good being taxed. My results suggest that policymakers should avoid including all commodity taxes in a taxed good's posted price and should instead levy some or all of the tax in a less salient way (e.g., by utilizing a register tax).

After investigating a number of potential barriers to implementing the efficient degree of salience, I expanded my model to account for objectives other than simply maximizing consumer welfare. In particular, I argued that policymakers seeking to adjust taxpayer behavior should typically rely on a higher fraction of high-salience taxes than suggested by the efficient tax formula. Policymakers attempting to reduce a tax's regressivity may also manipulate salience to achieve their goals, but doing so successfully requires careful empirical study of the good in question. Across all of these dimensions, a better understanding of tax salience can foster substantial improvements in the design of tax policy.

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111. Although this Note has focused on salience in the context of commodity taxes, many of the results speak to broader questions of tax policy. In particular, the same guidelines that promote efficient commodity taxation also yield insights into income tax design. On the other hand, income taxes also pose unique distributional considerations: policymakers can tailor the salience of the income tax to particular income groups in a way that is not possible under commodity taxes, where all consumers face the same tax rate. For example, complex requirements for claiming the Earned Income Tax Credit likely impose a very different distributional burden than do those of the Alternative Minimum Tax.

APPENDIX

This Appendix derives the efficient tax salience formula discussed in Part II of this Note. For simplicity, I assume that the government has perfect control over the salience of the tax that it imposes. A more technical article relating to this Note derives the result for the case in which the government is constrained to choose between two instruments with fixed salience.[112]

Suppose that society is composed of a representative consumer who divides her income between some taxed good x and a composite of all other goods y. For convenience, I assume that utility is concave, smooth, and additively separable in x and y, $U(x, y) = u(x) + v(y)$. The consumer's budget constraint takes the form $BC: y + (p+t)x = I$, where p represents the pretax price of x, t represents the tax on x, I is income, and the price of y is normalized to 1. Following Chetty, Looney, and Kroft, I assume that tax design enters utility only through consumption[113] and that consumers choose rationally when faced with fully salient taxes.[114]

Consumption is determined in two steps. First, the consumer chooses her intended consumption bundle according to her perceived budget constraint $\overline{BC}: y + (p + \theta t)x = I$, where $\theta \in [0, 1]$ represents the salience of the tax. The (x, y) pair that maximizes utility subject to the perceived budget constraint is the *intended consumption bundle* $(\hat{x}, \hat{y})$. The presence of the θ parameter reflects the empirical evidence that consumers fail to fully account for low-salience taxes; the less salient the tax—the smaller the value of θ—the less the consumer takes the tax into account when choosing her intended consumption bundle. Note that the intended consumption bundle will generally fail to satisfy the true budget constraint (BC).

Because consumption decisions must ultimately be feasible, closing the model requires specifying how infeasible intended consumption bundles are mapped into feasible final consumption bundles. To pin down final consumption, I assume that accidental overspending on x is offset by reduced expenditures on y. In the model's notation, $x = \hat{x}$ and $y = I - (p+t)\hat{x}$.[115] This assumption is natural for the case in which y represents all goods other than x and individuals make at least some of their consumption decisions after

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112. *See* Goldin, *supra* note 46, at 4-5.

113. I discuss possible violations of this assumption in Section III.C, *supra*.

114. *See* Chetty et al., *supra* note 12, at 1170.

115. Note that I am implicitly assuming x to be a small enough portion of total consumption so that an agent's intended consumption of x is never infeasible, even after taking the register tax into account.

purchasing x; consumers who accidently overspend on x will have less income available to spend on their remaining purchases (which are all part of y).[116]

We are now in a position to investigate how changes in the tax affect consumption. Holding income and pretax prices fixed,[117] we can express demand as a function of the tax's size and its salience, $x = x(t, \theta)$ and $y = y(t, \theta)$. Note that when the tax is fully salient (i.e., when $\theta = 1$), the perceived budget constraint matches the true budget constraint and hence intended consumption matches final consumption. In that special case, final consumption corresponds to the solution of the standard utility maximization problem:

Equation (1).

$$(x(t,1),\, y(t,1)) = \arg \max_{x,y} U(x,y) \ \text{ s.t. B.C.}$$

In contrast, when $\theta < 1$, the final consumption bundle will not satisfy (1). Although the pretax price of x and the tax enter the true budget constraint symmetrically, demand responds less to changes in the tax than to changes in the pretax price:

Equation (2).

$$\frac{\partial x}{\partial t} = \theta \frac{\partial x}{\partial p}$$

Equation (3).

$$\frac{\partial y}{\partial t} = -(p+t)\theta \frac{\partial x}{\partial p} - x$$

Similarly, because tax salience only affects utility through the perceived budget constraint, we can write:

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116. In principle, one could choose a different rule for mapping consumers' suboptimal decisionmaking into feasible consumption bundles. In other work, I show that the qualitative insights identified here are robust to variations in the budget-adjustment rule that one employs. *See* Goldin, *supra* note 46; *see also* Chetty et al., *supra* note 64, at 28-30 (discussing budget-adjustment rules).

117. As Chetty, Looney, and Kroft argue, pretax prices may indeed respond to tax salience. Chetty et al., *supra* note 12, at 1167-69. The normative implications of this observation are explored in Chetty, *supra* note 43, and in Goldin & Homonoff, *supra* note 22, at 33-34.

Equation (4).

$$\frac{\partial x}{\partial \theta} = t \frac{\partial x}{\partial p}$$

Equation (5).

$$\frac{\partial y}{\partial \theta} = -(p+t)t \frac{\partial x}{\partial p}$$

To incorporate tax policy into the model, consider a government that must raise a fixed amount of revenue, $\overline{R}$, from taxes on x. How should the government set the tax's size and salience to accomplish this goal while minimizing harm to consumers? The lower the salience of the tax, the less consumers substitute demand away from the taxed good, and hence the lower the size of the tax needed to raise the required amount of revenue. Totally differentiating the government's revenue constraint, $\overline{R} = tx(t,\theta)$, yields the tax change associated with a revenue-neutral reduction in salience:

Equation (6).

$$\left. \frac{\partial t}{\partial \theta} \right|_{\overline{R}} = \frac{-t^2 \dfrac{\partial x}{\partial p}}{t\theta \dfrac{\partial x}{\partial p} + x}$$

How does a revenue-neutral reduction in a tax's salience affect consumer well-being? Indirect utility is given by $V(t, \theta) = u(x(\mathrm{t},\theta)) + v(y(t, \theta))$, so that the welfare effect of a salience change can be found by totally differentiating V subject to the government revenue constraint:

Equation (7).

$$\left. \frac{dV}{d\theta} \right|_{\overline{R}} = \frac{\partial x}{\partial p}\left(r + \left. \frac{\partial t}{\partial \theta} \right|_{\overline{R}} \theta\right)(u'(x) - (p+t)v'(y)) - v'(y)x \left. \frac{\partial t}{\partial \theta} \right|_{\overline{R}}$$

A Taylor approximation can help us express (7) in more intuitive terms. Let $(x^\star, y^\star)$ denote the optimal final consumption bundle—the bundle a rational consumer would pick if the tax were fully salient, $x^\star(t,\theta) = x(t,1)$ and $y^\star(t,\theta) = y(t,1)$. Taking first-order Taylor approximations of $u'(x)$ and $v'(y)$ around $(x^\star, y^\star)$, and using (1), allows us to write:

Equation (8).

$$u'(x) - (p+t)v'(y) \approx (x - x^\star)\gamma$$

where $\gamma \equiv u''(x^\star) + (p+t)^2 v''(y^\star)$. Similarly, the first-order Taylor approximation of x around $x^\star$ allows us to write:

Equation (9).

$$x - x^\star \approx -(1-\theta)t \frac{\partial x}{\partial p}$$

where $\dfrac{\partial x}{\partial p}$ is evaluated at $(x^\star, y^\star)$.

Substituting (8) and (9) into (7) allows us to express the conditions under which a revenue-neutral increase in salience will raise consumer welfare:

Equation (10).

$$\left. \frac{dV}{d\theta} \right|_{\bar{R}} \geq 0 \Leftrightarrow (1-\theta)\gamma \frac{\partial x}{\partial p} \geq v'(y^\star) + (p+t)t \frac{\partial x}{\partial p}(1-\theta)v''(y^\star)$$

Finally, recall that at the optimal consumption bundle, one can express demand in terms of the utility function[118]:

$$\frac{\partial \tilde{x}}{\partial p} = \frac{v'(y^\star)}{\gamma} \ \text{ and } \ \frac{\partial x}{\partial I} = \frac{(p+t)v''(y^\star)}{\gamma}$$

Substituting those identities into (10) yields the formula for efficient salience:

Equation (11).

$$\theta^\star = 1 - \frac{\tilde{\varepsilon}_{x,p}}{\varepsilon_{x,p}(1-(\frac{t}{p+t})\omega_x \eta_{x,I})} \, ,$$

where the income elasticity of x is

$$\eta_{x,I} \equiv \frac{\partial x}{\partial I}\frac{I}{x} \, ,$$

the compensated own-price elasticity of demand for x is

$$\tilde{\varepsilon}_{x,p} \equiv -\frac{\partial \tilde{x}}{\partial p}\frac{(p+t)}{x} \, ,$$

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118. The derivative of Hicksian (compensated) demand for x with respect to price is denoted by $(\partial \tilde{x} / \partial p)$.

the budget share of x is denoted by

$$\omega_x \equiv \frac{(p+t)x}{I},$$

and the uncompensated own-price elasticity of demand for x is

$$\varepsilon_{x,p} \equiv -\frac{\partial x}{\partial p}\frac{(p+t)}{x} = \tilde{\varepsilon}_{x,p} + \omega_x \eta_{x,p}.$$

All elasticities are evaluated at the optimal consumption bundle $(x^\star, y^\star)$.