

Policy Evaluation

7. How can taxes (and other policies) be designed to discourage harmful behavior?

Introduction to SCM

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The window tax in Britain (1697 to 1851)

At first blush, taxing windows may seem anachronistic or just plain folly. But it was actually pretty clever

The problem faced by the government of the time was to find a tax that:

- increased with wealth (for fairness)
- was easily verified (to avoid disputes)
- and – being intended to replace a tax on fireplaces, hated for requiring inspectors to check inside the property, observable from afar

The answer: the number of windows in a house was a decent proxy for the wealth of its occupants, so that on average, wealthier people would owe more window tax

But this idea had many limitations

First, that led to unfairness. Adam Smith wrote that "A house of ten pounds rent in a country town may sometimes have more windows than a house of five hundred pounds rent in London; and though the inhabitant of the former is likely to be a much poorer man than that of the latter, yet so far as his contribution is regulated by the window-tax, he must contribute more to the support of the state."

The window tax also induced changes in behaviour by which taxpayers reduced how much they owed, but only at the expense of suffering some new harm

- The obvious incentive created by the tax was to have fewer windows, if need be by bricking up existing ones

The harm was not trivial: poor ventilation spread disease and lack of light led to a deficiency of vitamins. Opponents called the tax as one on "the light of heaven" and a "tax on health"



Corrective taxes

Corrective taxes are taxes on specific goods that are designed to alter individuals' consumption decisions:

- often implemented as excise taxes
- e.g. on motor fuels, tobacco, alcohol, sugar

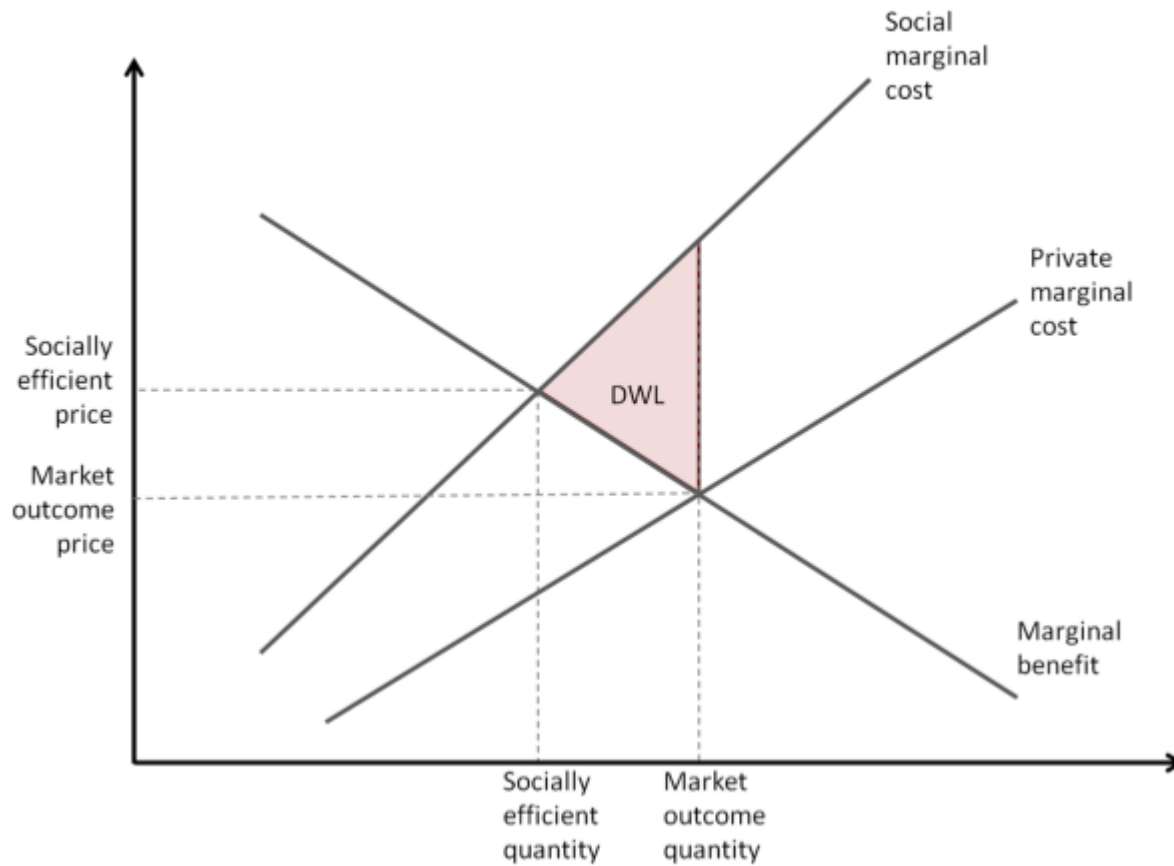
More formally, corrective taxes are designed to correct for the presence of externalities in a market

Externalities arise whenever the actions of one economic agent directly affects another economic agent outside the market mechanism

- example: a factory polluting a river used for swimming by residents
- not an example: a factory that uses lots of electricity and therefore bids up the price for other customers

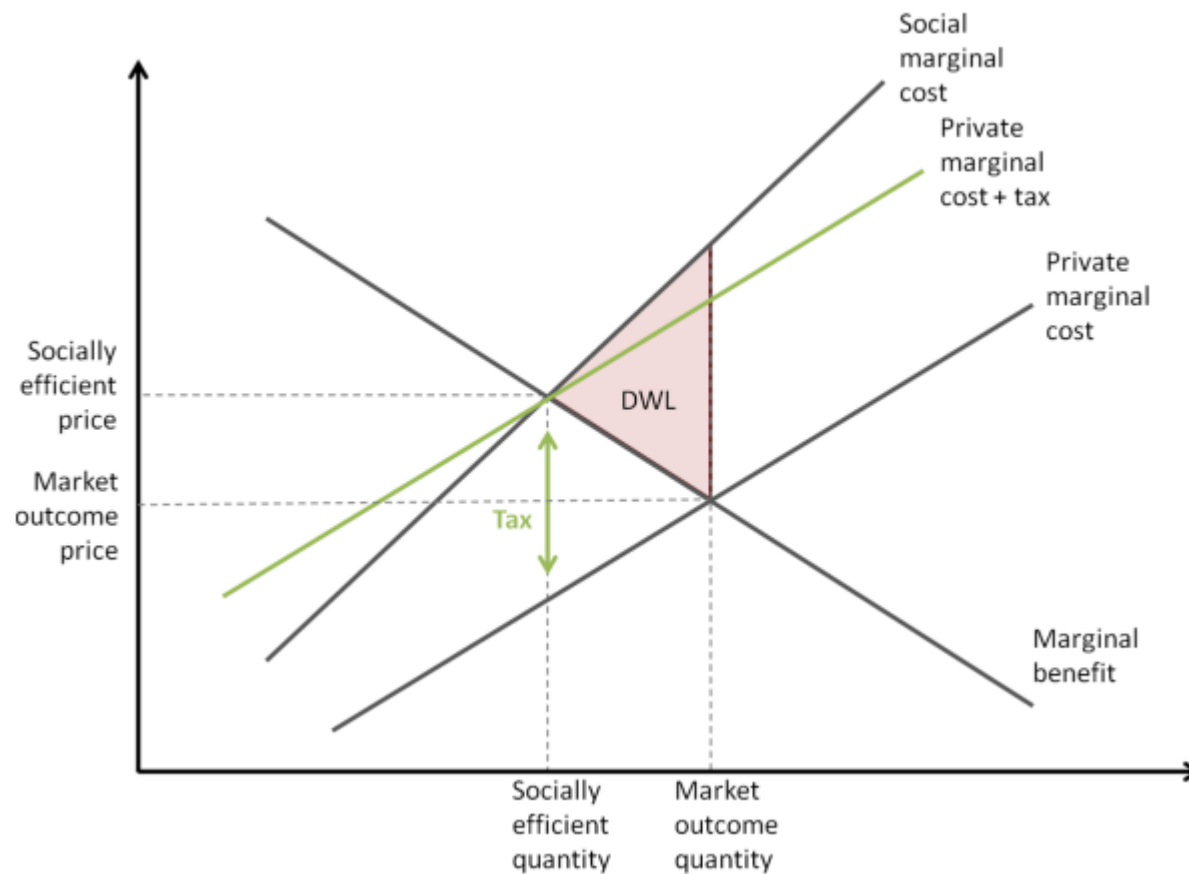
Setting corrective taxes

In absence of intervention, $MB = PMC$



Unlike other taxes, corrective taxes restore efficiency

By setting the tax rate equal to the marginal externality we align consumers' MB and PMC at the efficient quantity



Setting corrective taxes in practice

This looks very simple, BUT, in reality, there are complicating factors:

- measuring the externality
- restricted instruments available to government
- variation across consumers
- concerns about distributional effects

Let me show you one example...

Externalities associated with alcohol

Health costs of alcohol consumption are high:

- 5.9% global deaths, and 5.1% of the global burden of disease and injury is attributable to alcohol (WHO, 2014)
- roughly 70% of liver cirrhosis is attributable to alcohol

Also linked to violence and crime:

- around 1/3 domestic violence occurs when the perpetrator is under the influence of alcohol
- the alcohol attributable fraction of road traffic deaths is 16.6% for men and 6.7% for women

Externalities associated with alcohol

Recall that the optimal Pigouvian tax, that achieves the first best, is to set the tax equal to the marginal externality

In an ideal world, this would mean charging a different tax rate to different individuals and varying across consumption occasions (i.e. lower rate on the first drink than the fifth drink)

If we have to set a single tax rate for all consumers we can no longer achieve the first best:

- trade-off between reducing the consumption of people who consume more than is ideal and raising the prices faced by individuals whose behaviour does not generate external costs

Improving the system

Griffith, O'Connell and Smith (2019, J Pub E) characterise optimal corrective taxes in the alcohol market, and compare it to the current UK system.

They show that there is scope for significant welfare gains from:

- 1) levying taxes on ethanol rather than on volume
- 2) increasing the tax rate on cider
- 3) reducing the tax rate on spirits below 20% ABV (Alcohol by volume), and increasing the rate on spirits above 20% ABV

Do these taxes work?

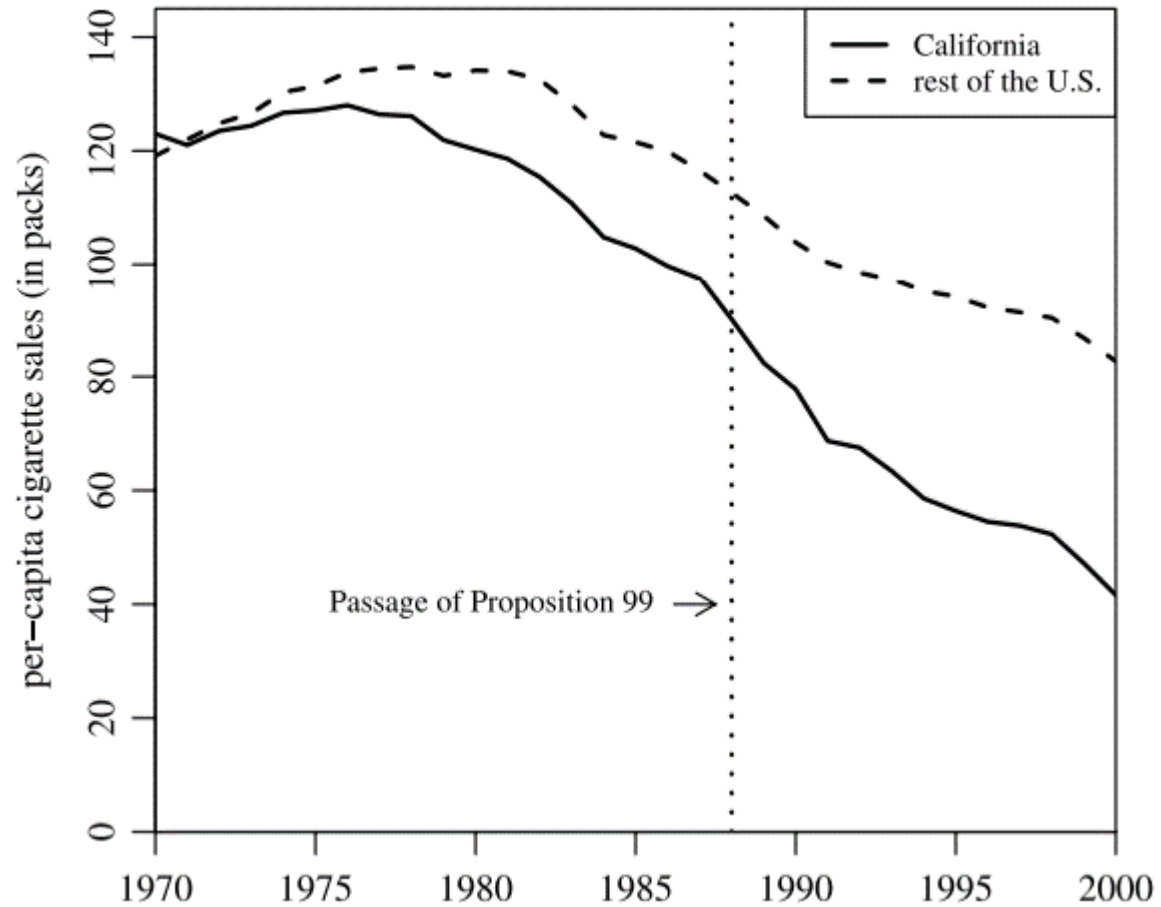
California's Proposition 99 implemented in 1988:

- increased cigarette excise tax by 25 cents per pack
- earmarked the tax revenues to health and anti-smoking education budgets, funded anti-smoking media campaigns, and spurred local clean indoor-air ordinances throughout the state

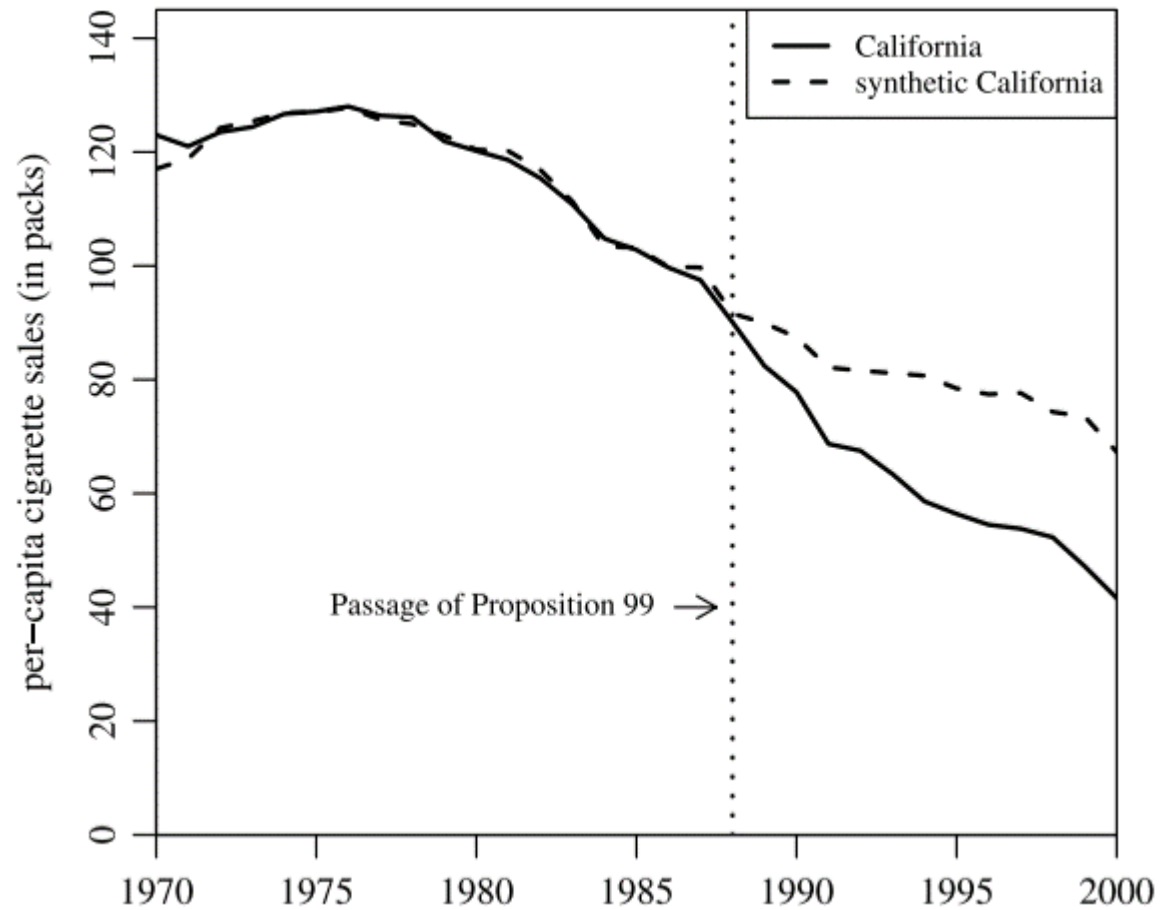
Upon initial implementation, Proposition 99 produced more than \$100 million per year in anti-tobacco projects for schools

Abadie et al. (2010, JASA) use a new method to study this issue: the synthetic control method (SCM)

Abadie et al. (2010): descriptive evidence



Abadie et al. (2010): the SCM



Synthetic California is constructed as a weighted average of

potential control states, with weights chosen to best reproduce the values of a set of predictors of cigarette consumption in California before the passage of Proposition 99

Table 1. Cigarette sales predictor means

Variables	California		Average of 38 control states
	Real	Synthetic	
Ln(GDP per capita)	10.08	9.86	9.86
Percent aged 15–24	17.40	17.40	17.29
Retail price	89.42	89.41	87.27
Beer consumption per capita	24.28	24.20	23.75
Cigarette sales per capita 1988	90.10	91.62	114.20
Cigarette sales per capita 1980	120.20	120.43	136.58
Cigarette sales per capita 1975	127.10	126.99	132.81

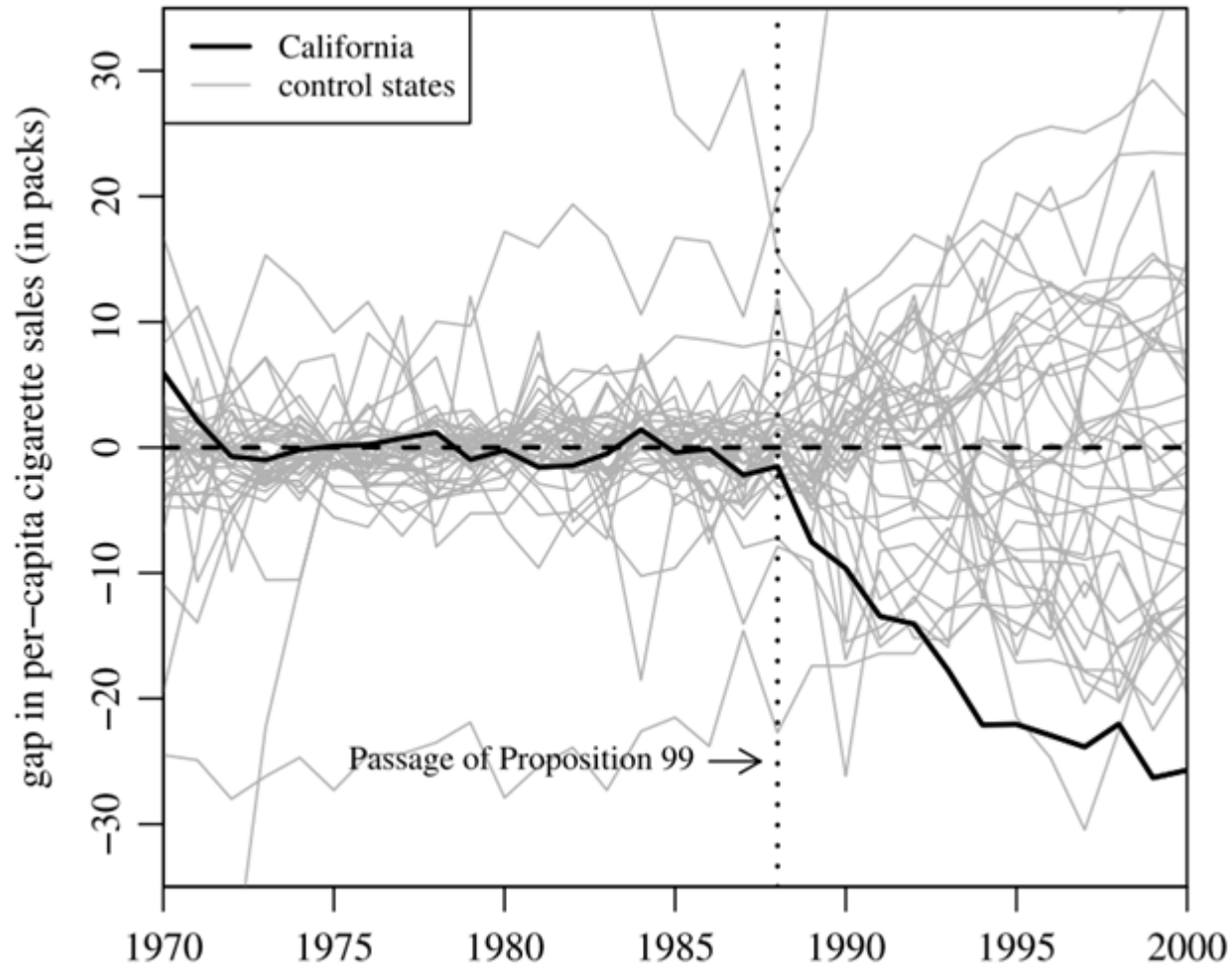
NOTE: All variables except lagged cigarette sales are averaged for the 1980–1988 period (beer consumption is averaged 1984–1988). GDP per capita is measured in 1997 dollars, retail prices are measured in cents, beer consumption is measured in gallons, and cigarette sales are measured in packs.

They discard from the donor pool states that adopted some other large-scale tobacco control programs during this period

Table 2. State weights in the synthetic California

State	Weight	State	Weight
Alabama	0	Montana	0.199
Alaska	–	Nebraska	0
Arizona	–	Nevada	0.234
Arkansas	0	New Hampshire	0
Colorado	0.164	New Jersey	–
Connecticut	0.069	New Mexico	0
Delaware	0	New York	–
District of Columbia	–	North Carolina	0
Florida	–	North Dakota	0
Georgia	0	Ohio	0
Hawaii	–	Oklahoma	0
Idaho	0	Oregon	–
Illinois	0	Pennsylvania	0
Indiana	0	Rhode Island	0
Iowa	0	South Carolina	0
Kansas	0	South Dakota	0
Kentucky	0	Tennessee	0
Louisiana	0	Texas	0
Maine	0	Utah	0.334
Maryland	–	Vermont	0
Massachusetts	–	Virginia	0
Michigan	–	Washington	–
Minnesota	0	West Virginia	0
Mississippi	0	Wisconsin	0
Missouri	0	Wyoming	0

How often would we obtain results of this magnitude if we had chosen a state at random for the study instead of California?
Answer: run placebos



SCM: Advantages

When a policy affects a small number of aggregate units, the potential applicability of SCM to comparative case studies is very large, especially in situations where traditional regression methods are not appropriate

Transparency of the counterfactual: Synthetic controls make explicit the contribution of each comparison unit to the counterfactual of interest.

Safeguard against specification searches: SCM weights can be calculated and pre-registered/publicized before the actual intervention takes place. This can play a role similar to pre-analysis plans in RCTs (see Olken, 2015), providing a safeguard against specification searches and p-hacking

Internalities: a further rationale for corrective taxes

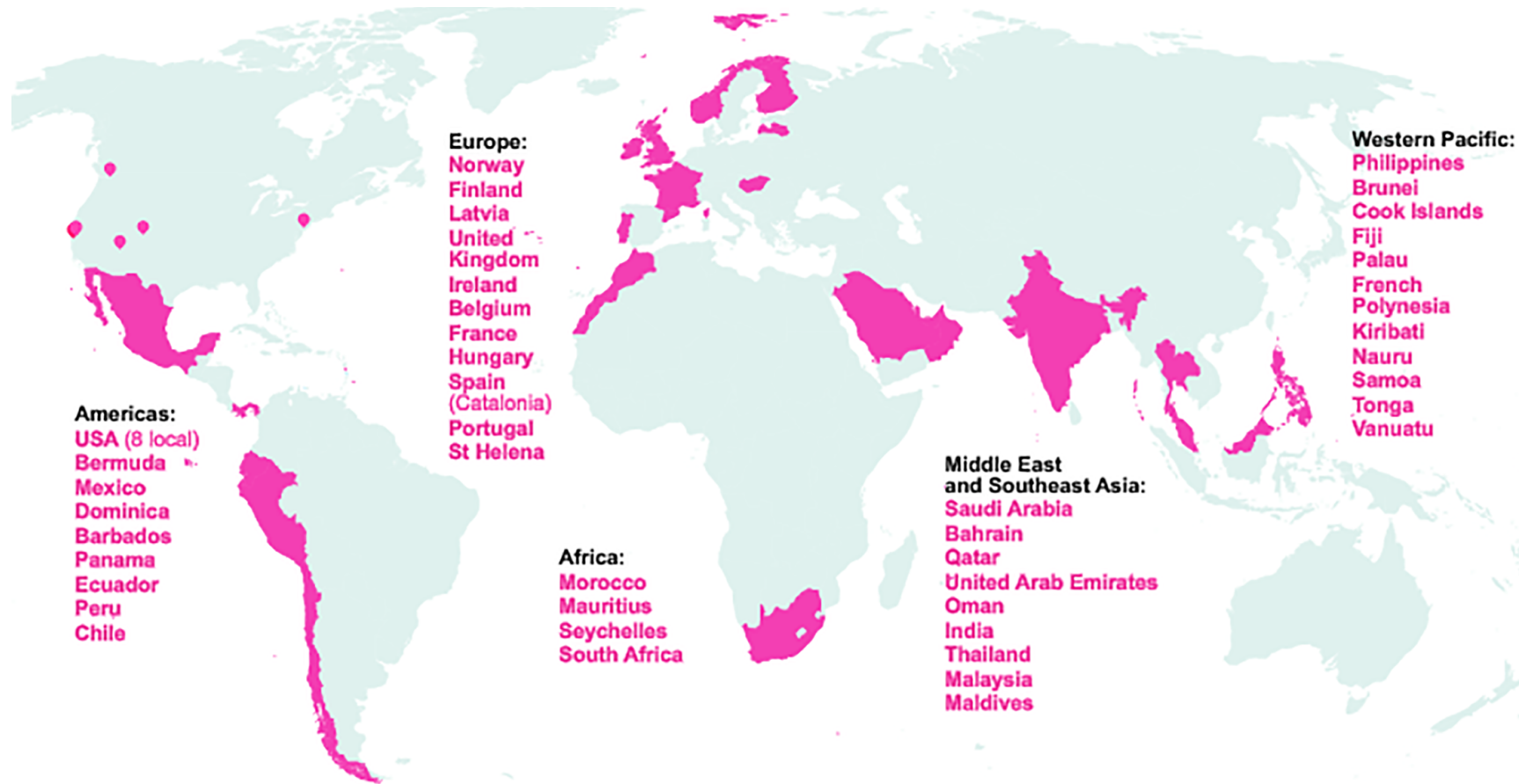
Internalities arise whenever there is a cost to oneself that an economic agent fails to take account of at the point of taking the decision

E.g., eating unhealthy food imposes large future costs on individuals (reduced productivity, worse health, higher mortality)

Paternalism (Libertarian View): Individual failures do not exist and government wants to impose its own preferences against individuals will

Individual Failures (Behavioral Economics View): Individual Failures exist - self-control problems, cognitive limitations, ...

Soda taxes around the world as of 2020



Updated August 2020 by the Global Food Research Program, the University of North Carolina, Chapel Hill. Base map by FreeVectorMaps.com

The Portuguese Soda Tax

Implemented in 2017 – One of the first soda taxes that increases with sugar content

Consumer behavior

- Increase in prices
- Improved awareness of adverse health effects

Producers may react by changing recipes

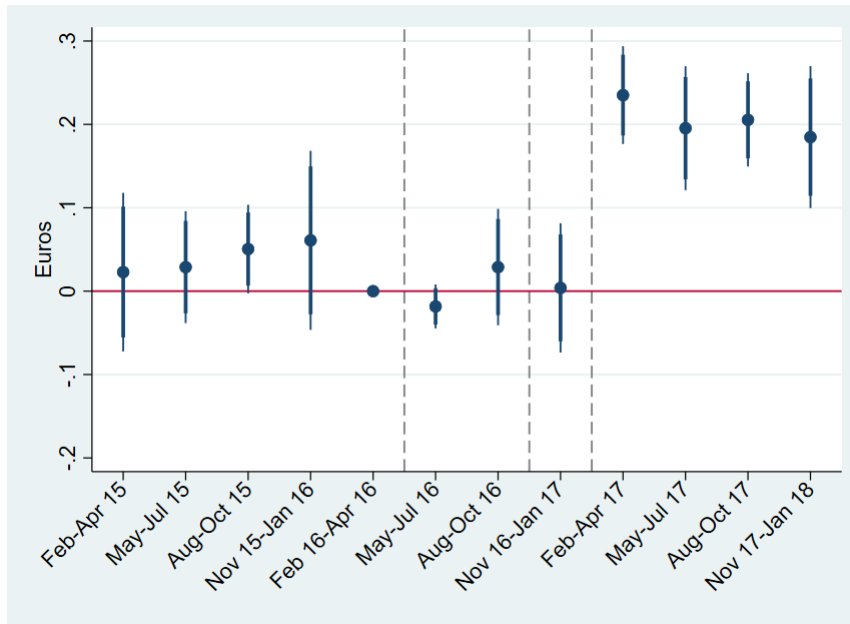
- Consumption may decrease if consumers dislike the new taste
- Consumption may increase if perceived as healthier

Gonçalves and Santos (2020, SSM) use product-level data from one of the two largest retailers in Portugal

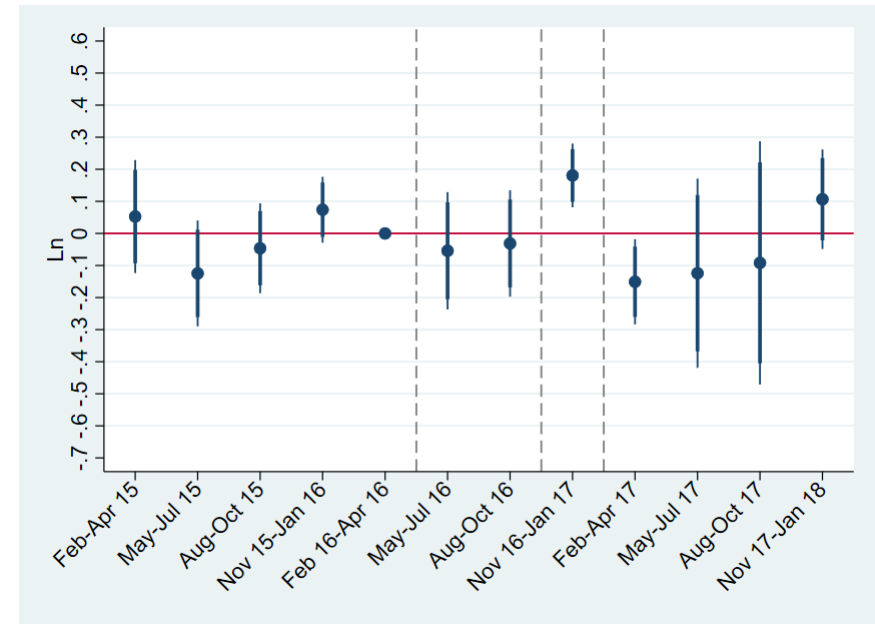
- DiD: soda prices and consumption vis-à-vis bottled water (why is it a good counterfactual?)

Gonçalves and Santos (2020): High sugar

Prices



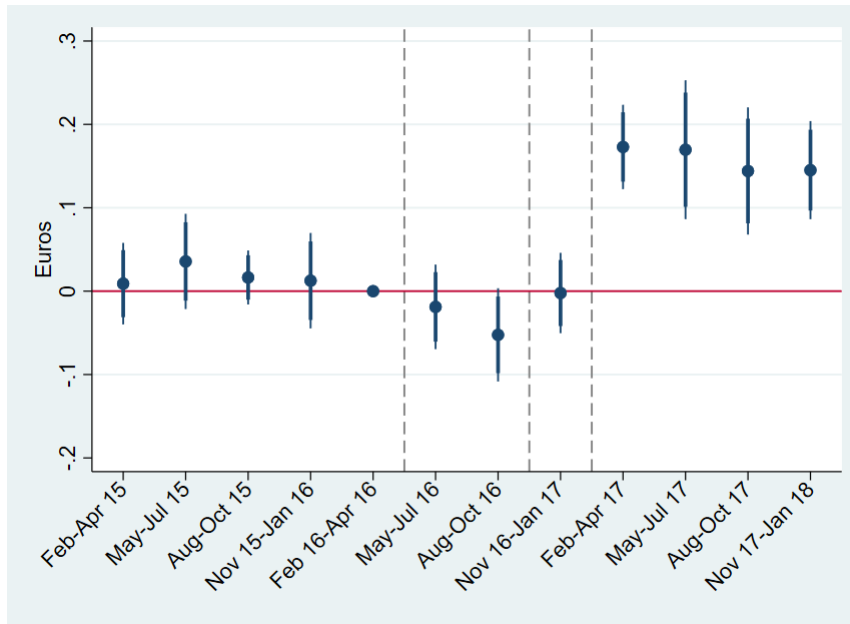
Quantities



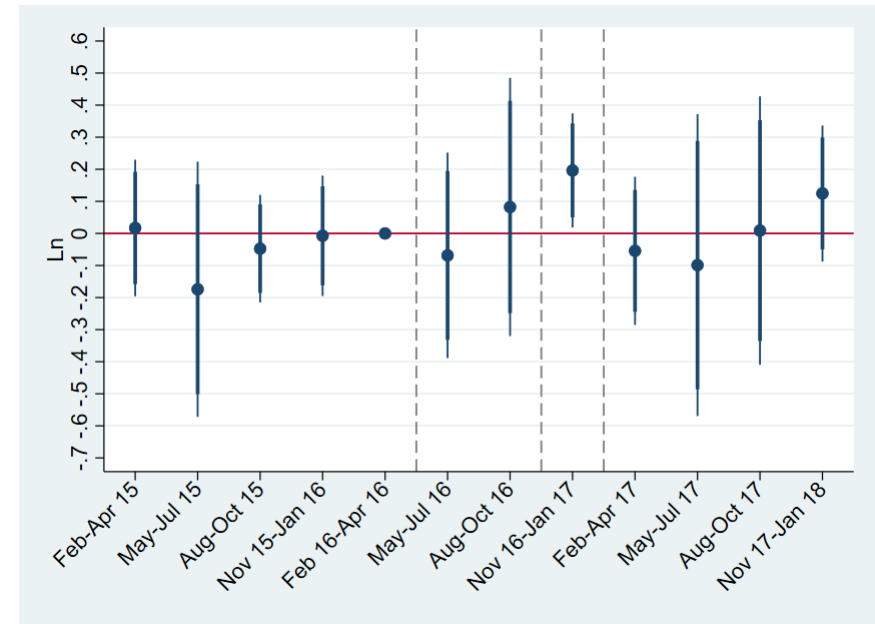
- Pass through of 100%
- Evidence for stockpiling

Gonçalves and Santos (2020): Medium sugar

Prices



Quantities



- Pass through above 100%
- Marginal evidence for stockpiling

Incorporating insights from behavioral economics

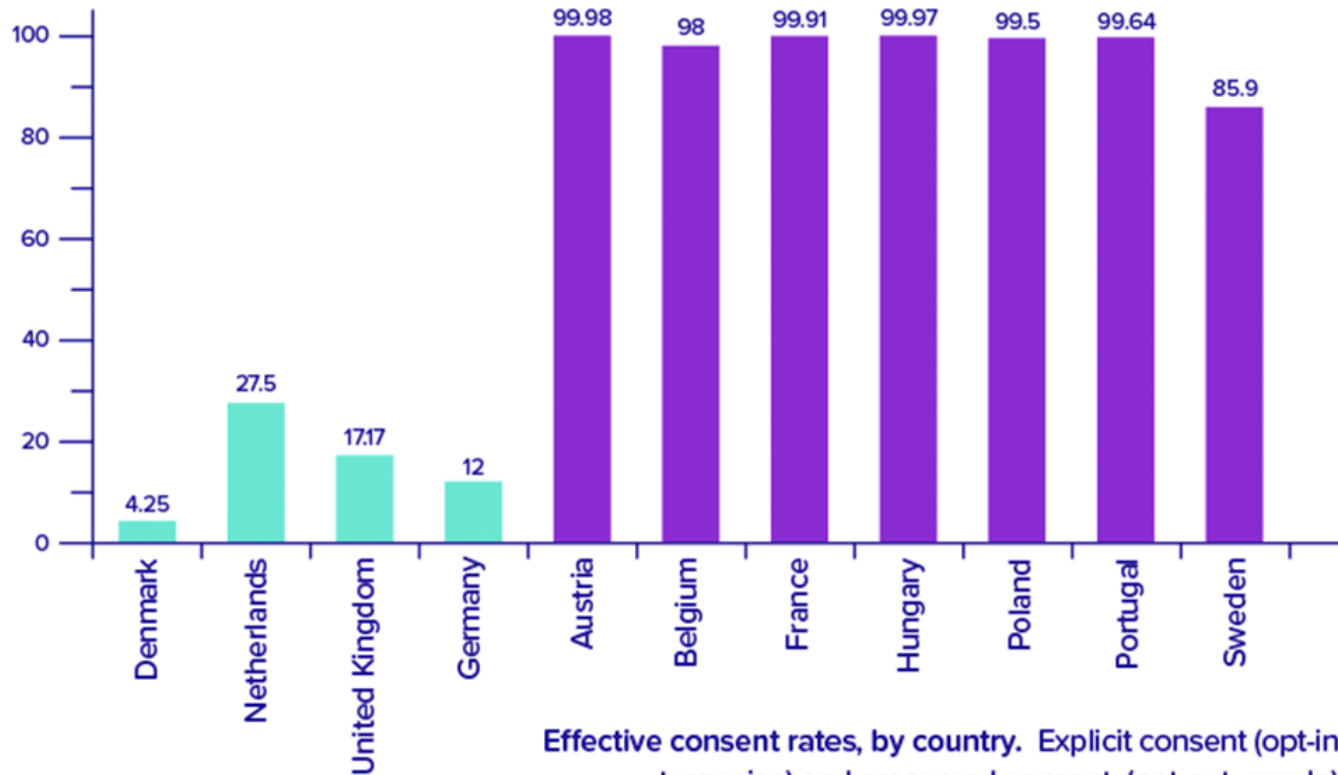
Insights from behavioral economics shifted policy approaches in several areas in the past few years

One thing that is currently more understood is the importance of properly selecting default options:

- People tend to choose the easiest option to avoid complex decisions
- Defaults provide a cognitive shortcut and signal what people are supposed to do
- People don't like to disrupt the status quo – it's easier and more comfortable to stick to what was decided

One of the most prominent examples of this comes from a study on organ donation

Organ donations in Europe



Nations where everyone was listed by default have higher donation rates than nations that required their citizens to opt-in

Saving enough for retirement?

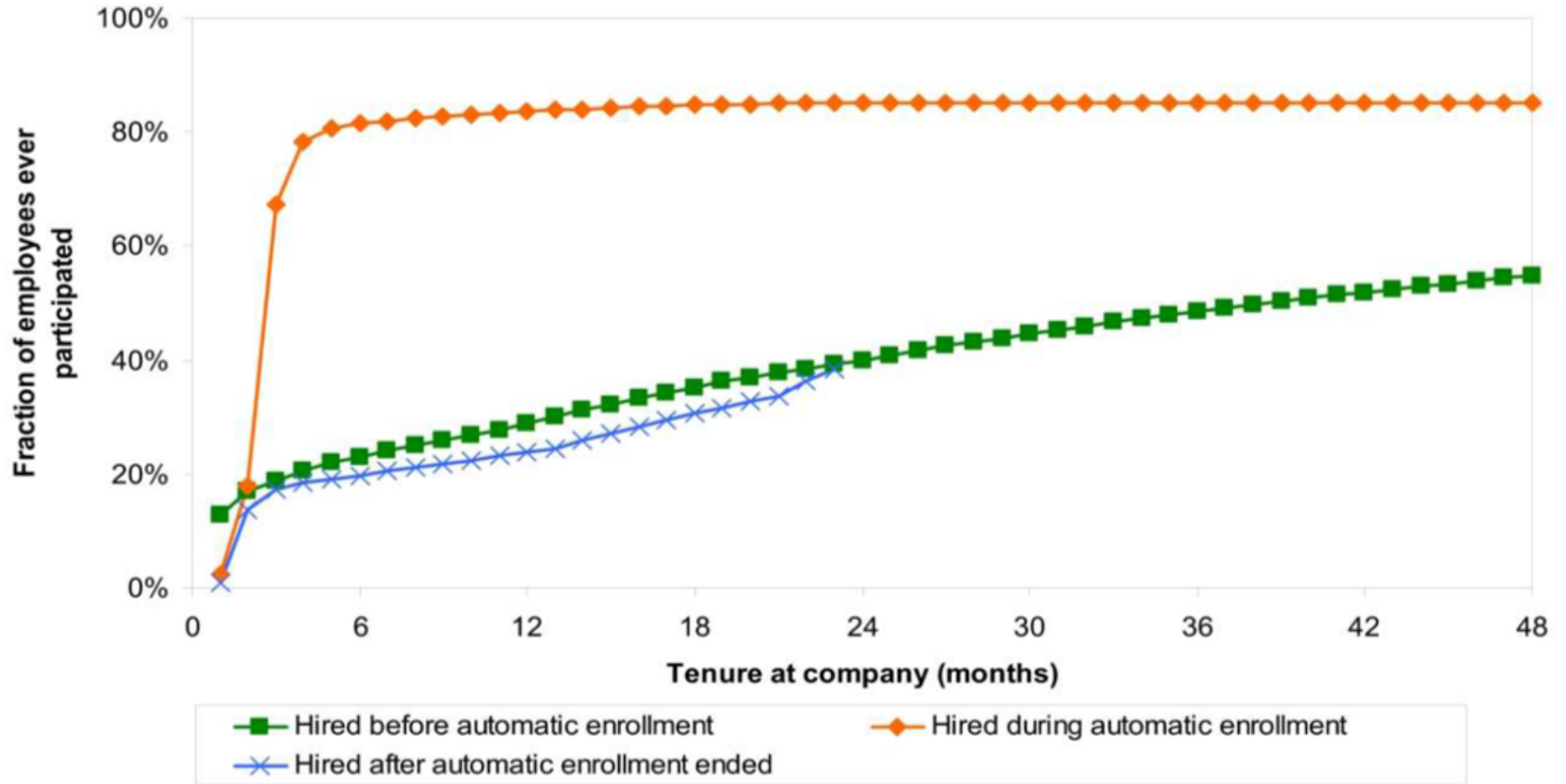
Several countries effectively spend billions on programs to increasing saving for retirement

Madrian and Shea (2001, QJE) analyze impacts of employer defaults (inertia) on individuals' 401(k) retirement account contributions

Defaults just change whether employees opt-in or opt-out of retirement saving

Does not change actual incentives to save, so should have no impact under traditional economic model

Madrian and Shea (2001)



Crowdout in Retirement Savings Accounts

Do defaults increase total savings or just lead to shifting of assets from non-retirement to retirement accounts?

Impacts of defaults on total saving not obvious despite Madrian and Shea evidence

Even inattentive individuals still have to satisfy budget constraint by cutting consumption or savings in non-retirement accounts

Chetty et al. (2014, QJE) analyze this question using third-party reported data on all financial wealth for the population of Denmark

- the effects of retirement savings policies on wealth accumulation depend on whether they change savings rates by active or passive choice

Impacts of Defaults in Denmark

Employers make pension contributions on workers behalf automatically

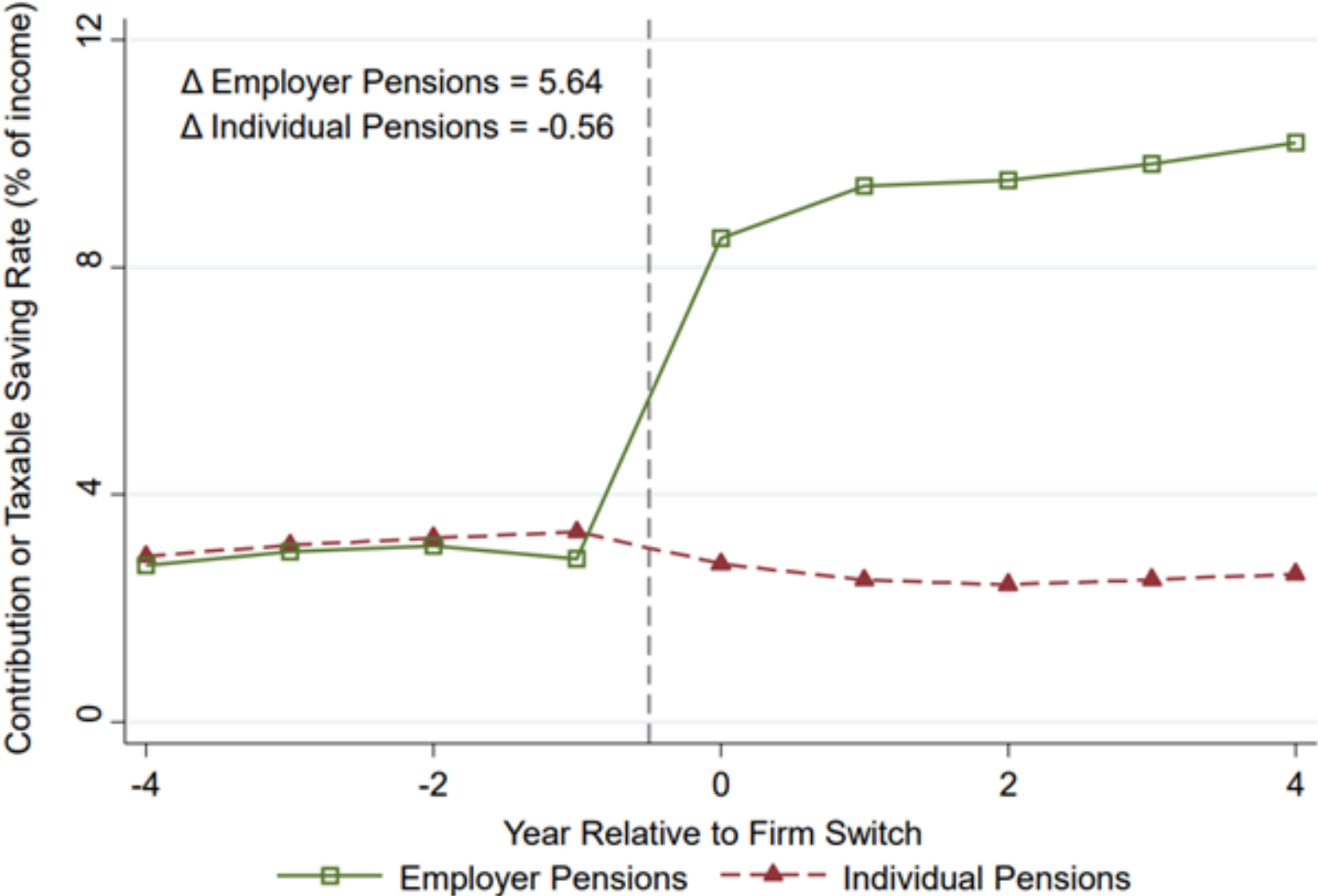
Contributions vary substantially across employers

Research design: event study of individuals who move to a firm that contributes at least 3 percentage points more of labour income to retirement accounts than their previous firm

Confirming previous intuition, retirement savings rate can change sharply when workers switch firms

But... do workers offset these changes in their own private savings?

Event Study around Switches to Firm with >3% Increase in Employer Pension Rate



Impacts of Retirement Savings Subsidies

Next, compare these effects to impacts of standard tax incentives for retirement saving

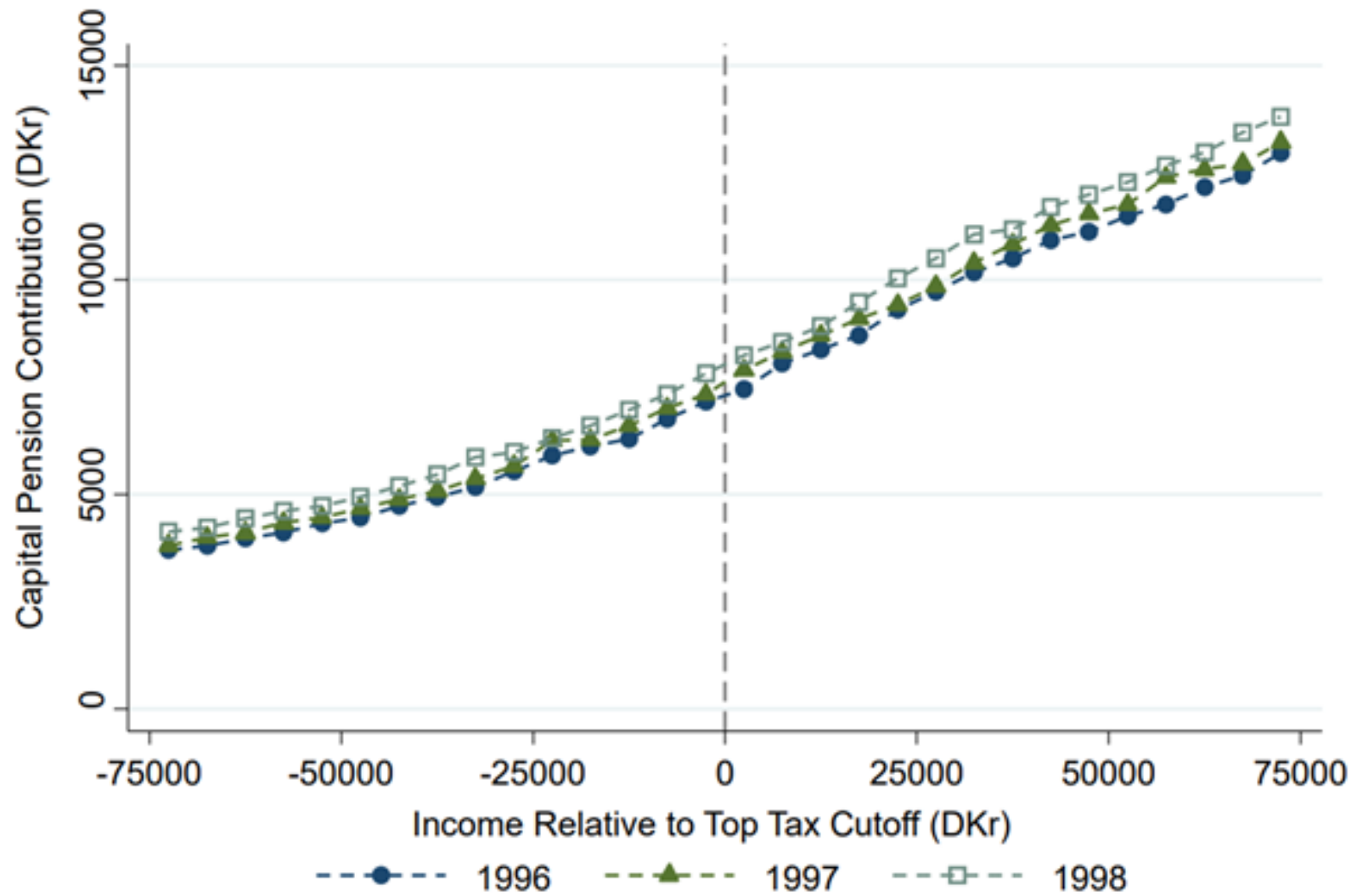
Denmark subsidizes individual's contributions to retirement accounts

Exploit a reform in 1999 in Denmark that lowered subsidy for saving in pension accounts by 12 cents per DKr for individuals in top income tax bracket

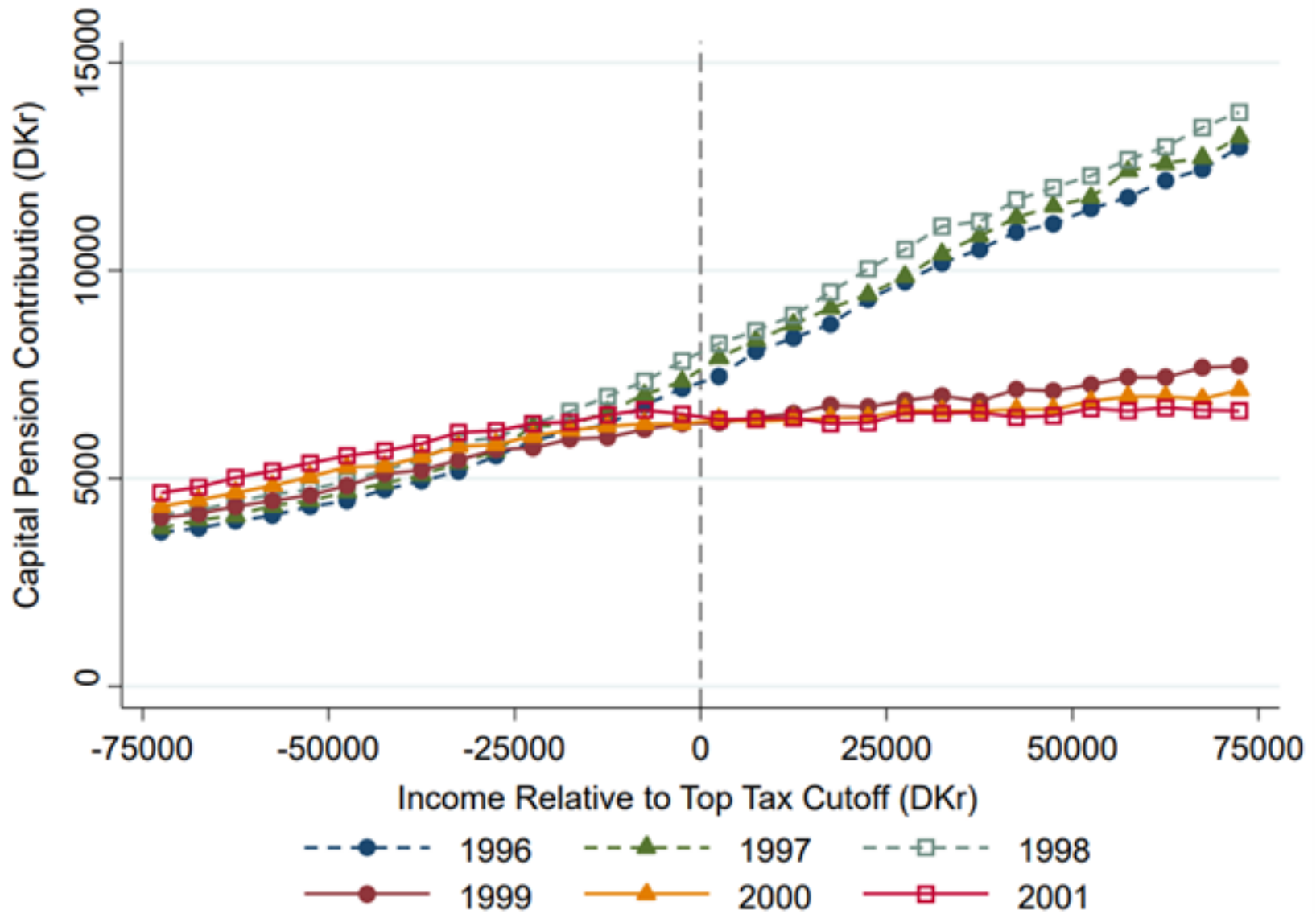
Ask two questions analogous to those above:

1. How did this reform affect contributions to pension accounts?
2. How much money was shifted to other non-retirement accounts?

Impact of 1999 Pension Subsidy Reduction On Pension Contributions



Impact of 1999 Pension Subsidy Reduction On Pension Contributions



Results: Active vs Passive savers

15% of people account for entire reduction in pension contributions following reform (“active savers”): these people simply shift money, with essentially no net change in total saving

Active savers tend to be wealthier and more financially sophisticated.

Subsidies for retirement accounts rely on individuals to take an action to raise savings, primarily inducing individuals to shift assets from taxable accounts to retirement accounts

- The authors estimate that each \$1 of government expenditure on subsidies increases total saving by only 1 cent.

85% of people are unresponsive to subsidies but are instead heavily influenced by automatic contributions made on their behalf (“passive savers”)

Policy implications

Automatic contributions/ defaults are more effective at increasing savings rates than subsidies for two reasons:

- (i) subsidies induce relatively few individuals to respond
- (ii) they do not increase the savings of passive individuals, who are, on average, least prepared for retirement

Behavioral economics perspective calls for shift toward automatic enrollment plans and reductions

We need to understand better why people do not take up benefits that they are seemingly eligible for

Imperfect take up of benefits

Bhargava and Manoli (2015, AER) study EITC benefits

- Roughly 25% of benefits are unclaimed
- Average of \$1K per person (roughly 1 month of earnings...)

RCT with the Tax Authority to increase knowledge of benefits


- Send mailers to all CA taxpayers who failed to claim 2009 EITC credit despite presumed eligibility
- Provided information and offered opportunity to re-file

Informed people of roughly \$26M in unclaimed benefits

Control mailing: notice and worksheet that subjects received just months earlier

Experimental conditions included several treatments

E.g., Complexity: 1 or 2 pages?

 <p>Department of the Treasury Internal Revenue Service Submission Processing Center Fresno, CA 93880-0425</p>	<table border="0"> <tr><td>Notice</td><td>EIC9627</td></tr> <tr><td>Tax Year</td><td>2009</td></tr> <tr><td>Notice Date</td><td>November 2009</td></tr> <tr><td>Social Security Number</td><td>999-99-9999</td></tr> <tr><td>To Contact Us</td><td>1-800-829-1040</td></tr> </table> <p>Page 1 of 4</p>	Notice	EIC9627	Tax Year	2009	Notice Date	November 2009	Social Security Number	999-99-9999	To Contact Us	1-800-829-1040
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JAMES G HINDS
22 BOULDER STREET
HANSON, CT 06030-7253

Important information about the Earned Income Credit
You may be eligible for a refund

Do not discard or overlook this notice because you may be entitled to some additional money.

Summary

Our records show that you may be eligible for a refund called the Earned Income Credit (EIC), which you did not claim on your 2009 tax form. The credit is for certain people who have worked and have earned income. You should complete the worksheet on Page 3 to determine if you are eligible for the credit.

What you need to do

Complete the Earned Income Credit Worksheet on Page 3.

If the worksheet confirms that you are eligible for the credit:
Sign and date the attached worksheet, and mail it to us in the enclosed envelope.

If the worksheet indicates that you are not eligible for the credit:
Please do not return the worksheet to us.

Next steps


If you are eligible for the credit, we will send you a refund check in 6 to 8 weeks. If you owe back taxes or other debts, such as child support which we are required to collect, we will use your credit to reduce or pay off those debts.

Next year, to receive your refund more quickly, write "EIC" on the EIC line of your form 1040. If you qualify for the credit, the IRS will calculate it for you and send you a check.

Additional information

If you need additional assistance, please call 1-800-829-1040, or visit online at www.irs.gov/efile. For tax forms, call 1-800-TAX-FORM (1-800-829-3676).

You can also find tax forms and other helpful documents which explain the EIC program in greater detail (e.g., Publication 596) at www.irs.gov.

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JAMES G HINDS
22 BOULDER STREET
HANSON, CT 06030-7253

**You May Be Eligible for a Refund
If You Qualify for the Earned Income Credit**

Why We Are Sending You this Notice

You may qualify for the earned income credit (EIC). The EIC is for certain people who work and have earned income. This tax credit usually means more money in your pocket. It reduces the amount of tax you owe, and may give you a refund. Our records show:

- Your income falls in the eligible range to receive the EIC,
- You have a dependent who may be an EIC qualifying child, and
- You did not claim the EIC on your 2009 Individual Income Tax Return.

What You Need to Do

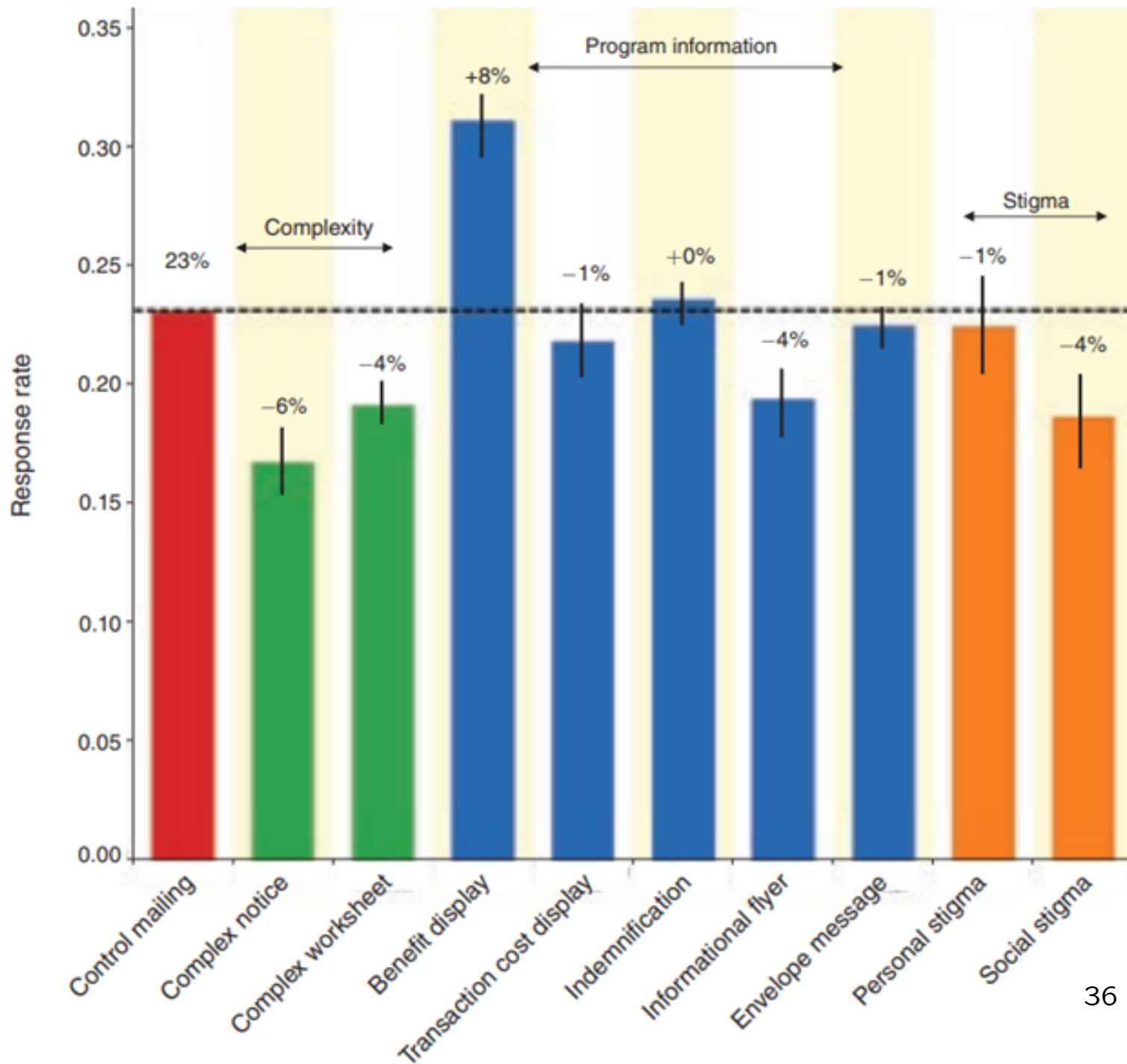
Income is not the only condition that determines if you qualify for EIC. We need you to complete the enclosed *EIC Eligibility Check-Sheet* to see if you may qualify for the EIC. Take the following steps to complete the check-sheet:

- Check that you are eligible for the EIC in Step 1.
 - If your Social Security Number is not valid or if you are a qualifying dependent of another person, you do not qualify.
 - If your Social Security Number is valid and you are not a qualifying dependent of another person, you may qualify. Continue to Step 2 only if you did not place a check next to any of the eligibility criteria in Step 1.
- In Steps 2 and 3, fill in the name and Social Security number for each child who may qualify you for the EIC and check that each child meets the stated requirements.
 - Any NO answer for a child means that child is not your qualifying child for the EIC. Do not respond to this notice unless you have a qualifying child.
 - All YES answers mean a child is your qualifying child for the EIC. Sign and date the declaration on the last page of this notice. Mail the completed *EIC Eligibility Worksheet* to us in the enclosed envelope.

Note: Return the EIC Worksheet to us only if you determine you may qualify for the EIC.

TABLE 3—EXPERIMENTAL INTERVENTIONS BY MECHANISM

Mechanism	Intervention	Description	Sample
<i>Complexity</i>			
Complexity (design)	1. Complex notice	Relative to simple notice, complex notice is two pages, features denser textual layout, and repeats eligibility information included in the worksheet	3,676
Complexity (length)	2. Complex worksheet	Relative to simple worksheet, complex worksheet includes additional, nondiscriminatory, questions regarding eligibility	10,979
<i>Program information</i>			
Benefit and cost information	1. Benefit display (low and high)	Simple notice reports upper bound of potential benefit (up to “\$457,” “\$3,043,” “\$5,057,” or “\$5,567”)	6,761
	2. Transaction cost (low and high)	Simple notice provides guidance as to worksheet completion time (less than 10 or 60 minutes)	3,475
Penalty/audit information	1. Indemnification message	Bold message on worksheet indemnifies against penalty for unintentional error	17,027
General program information	1. Envelope message	Envelope message indicates that enclosure communicates “good news”	17,044
	2. Informational flyer	One page flyer offers program information and trapezoidal benefit schedule	4,019
<i>Stigma</i>			
Personal stigma reduction	1. Emphasis on earned income	Simple notice emphasizes that credit is earned reward for hard work	1,844
Social stigma reduction	2. Social influence	Simple notice communicates that similarly situated peers are also claiming	1,753



Bhargava and Manoli (2015, AER) Results

Informed people of roughly \$26M in unclaimed benefits

- Roughly \$4M was paid as a result of the experiment

Results suggest:

- Imperfect information about benefits affects take up
- Displaying potential benefits increases take up /especially with benefits are high)
- Complicated forms reduce take up
- Increases take up at all eligible income levels