14.472 Public Finance II

Topic VI_a_ii: MVPF

Amy Finkelstein

Spring 2018
Road Map - Redistribution (Unit VI)

- Frameworks: Kaplow; Hendren and the MVPF
- Cash vs. In Kind Transfers: Why would we ever redistribute in-kind?
- Take-up and Self Targeting: Is low takeup "a problem"?
- Empirical application: Subsidizing health insurance for low-income adults
  - Empirical challenge: measuring WTP for an in kind good not traded in well functioning markets
  - Conceptual challenge: how to use estimates of WTP - what benchmarks?
Kaplow lecture laid out some conceptual issues in welfare economics

Up now: Empirical Welfare Analysis via the MVPF

- Key readings: Hendren (2016) "policy elasticity" and Hendren (2017) "Efficient welfare weights"
- See also my interpretation / cliff notes
"Credibility revolution" in applied economics (especially labor economics)

W(h)ither Public Finance?

- Many papers estimate the causal effects of public policies on various outcomes
- Labor economists may stop there, but public finance economists want to analyze welfare impact of public policies
Reminder: Two canonical approaches to welfare analysis

- Marginal excess burden (MEB) / marginal deadweight loss
  - Harberger 1964; Auerbach 1985; Auerbach and Hines 2002
- Marginal Cost of Public Funds (MCPF)
Marginal Excess Burden (MEB)

- Marginal excess burden / marginal deadweight loss
  - Harberger: marginal DWL from tax increase is loss of (consumer + producer) surplus in excess of $ of tax revenue raised
  - Auerbach and Hines: marginal excess burden of a tax change is the difference between the Hicksian equivalent (or compensating depending on researcher’s preference) variation associated with the tax change and the change in tax revenue

- Conceptual "critique": MEB assumes an arbitrary and unrealistic thought experiment: individual lump sum taxation (a policy instrument that does not exist) is used to hold individual utility constant in face of a given policy change

- Empirical "critique" - need to estimate compensated elasticities (income effects non distortionary)
  - Goolsbee's lament: "The theory relates to compensated elasticities, whereas the natural experiments provide information primarily on uncompensated elasticities"
Marginal Cost of Public Funds (MCPF)

- Compare benefits to costs
  - Estimate and monetize the benefits from a policy change (e.g. improved test scores, better health, reduced pollution) and compare to "the cost" of the policy
  - "the cost" of the policy is expenditures on policy multiplied by (1+MCPF)

- MCPF intended to provide an adjustment to costs to account for distortionary cost of raising tax revenue to finance that expenditure
  - Thought to be ~0.3

- Conceptual "critique": does not account for how the money is raised
  - Obviously no single "cost of public funds".
  - Optimal tax literature (Diamond-Mirlees) emphasizes that the cost of raising revenue differs across the income distribution
  - Empirically, literature suggests cheaper to raise revenue from rich than poor (mirror image of Okun's "leaky bucket").
Goal: Map empirical estimates of causal effects of a policy change into welfare analysis of that policy change

Welfare analysis meets causal inference

Definition: Marginal Value of Public Funds on a Policy:

\[ \text{MVPF} = \frac{\"Benefit\"}{\"Cost\"} \]

- ratio of the beneficiaries' willingness to pay (WTP) for the increase in expenditure out of their own income to the cost of the government of the increase in expenditure per beneficiary
Example: MVPF for a $1 increase in cash benefit

- Recall

\[ \text{MVPF} = \frac{"Benefit"}{"Cost"} \]

- Examples: TANF, EITC
  - Our object of interest: MVPF of a $1 increase in cash benefits

- Useful to think of two classes of recipients:
  - Infra-marginals (I) who were already receiving cash transfer
  - Marginals (M) who change their behavior in response to policy and become newly eligible for transfer (e.g. reduce labor supply to quality for TANF)

- Useful to separately consider benefits and costs
Example: MVPF for a $1 increase in cash transfer

\[ MVPF = \frac{"Benefit"}{"Cost"} \]

- What is the benefit of $1 increase? (i.e. what is WTP for the $?)
  - Inframarginals: $1
  - Marginals: 0 by envelope theorem
    - If individuals are optimally choosing their behavior, marginal individual who changes her behavior in response to marginal change in policy is indifferent to behavioral change.
    - Therefore numerator = $I$ ($1$ times number of inframarginals)

- Note: So far we have not needed to estimate anything to calculate benefits (including any causal effects)
  - Let’s turn to costs...
MVPF for a $1 increase in cash benefit (con’t)

\[ \text{MVPF} = \frac{\text{"Benefit"}}{\text{"Cost"}} = \frac{\$1}{\text{I}} \]

- What is the cost of $1 increase? Two types of costs
  - Mechanical cost: Increased government expenditures in absence of behavioral response: \$I
  - Fiscal externality: impact of any behavioral response to the policy on the government’s budget outlays.

- Fiscal externality, examples:
  - Reduce labor supply to become eligible for TANF, reducing government income tax revenue
  - Enter labor force to get EITC, increasing public EITC spending
  - Changes in consumption (hence sales taxe revenue), health (hence public health care spending), crime etc etc.

- Cannot use envelope theorem to ignore these behavioral responses bc agents making (privately optimal) responses to policy do not internalize external effects of the policy on the government budget.
MVPF for a $1 increase in cash benefit (con’t)

\[ MVPF = \frac{\text{"Benefit"}}{\text{"Cost"}} \]

- Recall Benefits: $I$
- Recall two components of costs:
  - Mechanical cost ($I$)
  - Fiscal externality
- Report MVPF normalized by mechanical cost ($I$)
  - i.e. MVPF per $1 increase in mechanical expenditure per infra-marginal beneficiary)

\[ MVPF^I = \frac{1}{1 + FE} \]

- where "FE" = fiscal externality = impact on government budget of the policy per dollar increase in mechanical expenditure on infra-marginal recipients
Fiscal externality (FE)

- Cannot invoke envelope theorem to ignore these behavioral responses
  - Agents making (privately optimal) behavioral changes in response to policy do not internalize *external effects of the policy on the government budget*
  - Causal effect of policy on government budget matters because of fiscal externality (recall derivation of Baily-Chetty)

- Fiscal externality is where welfare analysis meets causal inference
- Envelope theorem guarantees behavioral responses by individuals do not directly affect own utility
  - But if behavioral response had external effects on individuals besides recipients, these need to be taken into account
  - Not this could include other actors, not just government... to be continued..
Fiscal externality (FE)

- Fiscal externality can reduce costs below mechanical costs (e.g. improve health and reduce public spending on healthcare) or increase costs above mechanical cost.
- Fiscal externality can include behavioral responses to the program of both marginal and infra-marginal recipients.
  - e.g. infra-marginal recipients may change behavior (e.g. consumption and hence sales tax revenue) because of income effects.
Additional applications

- Welfare analysis of an increase of $1 of subsidy - same as above
- Welfare analysis of $1 of in-kind transfer (e.g. health insurance; food stamps)
  - Denote by $W$ the average inframarginal recipients’ WTP (out of own income) per dollar of in-kind benefit

$$MVPF^§ = \frac{W}{1 + FE}$$

- $W$ may be less than or more than 1 (why?)
- Additional (considerable) empirical challenge: Estimating $W$ - we will return to this
How do we use the MVPF?

- Suppose we estimate the MVPF of a targeted cash transfer. Now what?
  - Is a MVPF of $0.8 or $1.3 "good"? "bad"?

- Consider two policies that have same distributional incidence - both transfer to group $i$
  - Then policy with higher MVPF is preferred - it is a lower cost way of enacting the transfer

- A key attraction of MVPF is that can do comparative welfare analysis across policies without taking a stand on individual utility function or social welfare function
  - e.g. do we want to use EITC or TANF to transfer to low income individuals?
  - Economists' comparative advantage is not defining societal objectives but rather, given a societal objective, trying to achieve it at lowest resource cost
How do we use the MVPF (con’t)?

- What about comparing MVPF across policies that don’t target same populations?
  - Hendren (2017): use "efficient welfare weights"

- Efficient welfare weight $\nu_i$ denotes MVPF of a $1$ income tax cut to individuals of income $i$
  - In other words, compare MVPF of a policy that transfers $1$ to income group $i$ to MVPF of a $1$ tax cut to same group
  - $\nu_i$ is cost of transferring $1$ to individuals of income $i$ through an income tax cut to them.
  - MVPF of tax cut is $1/(1+\text{FE})$ where FE is impact of the tax cut on tax revenue via any behavioral response to tax cut.

- Why compare everything to transfers through income taxes?
  - Useful benchmark: spans what is arguably the most important form of heterogeneity in the population (differences in earnings potential)
Efficient welfare weights (con’t)

- \( \nu_i \): MVPF of transferring $1 to income group \( i \) through a tax cut
- Gives us a way of comparing MVPF of policy that transfers resources to income group \( i \) compared to a policy that transfers to income group \( j \) by “projecting” both policies onto the same population
- We prefer policy \( i \) to policy \( j \) if

\[
\frac{\text{MVPF}_i \nu_j}{\nu_i} > \text{MVPF}_j
\]

- Given that we can make transfers from \( i \) to \( j \) through the tax code, we can "turn" the policy targeted to \( i \) into a comparable MVPF for a policy targeted to \( j \) by multiplying by ratio of efficient welfare weights.
Efficient welfare weights also provide a way of evaluating a single policy.

If policy targets income group $i$, relevant benchmark is to compare policy’s MVPF to $\nu_i$.

- If policy’s MVPF exceeds $\nu_i$, there is a potential Pareto improvement: cut income taxes on group $i$ by $1$ and transfer it back to the group through the policy.

Note: if had non distortionary taxation, natural comparison would be to compare MVPF to $1$ (Kaldor-Hicks efficiency).
To estimate distribution of $v_i$ under existing tax schedule need:

- tax schedule
- tax data on distribution of income
- empirical estimates of elasticity of taxable income at different income levels

Estimates MVPF of $1 tax cut at high end of income distribution

$\sim$1.5

A dollar tax cut to the rich generates $1 in benefits and costs about $0.65 (negative fiscal externality because of increased labor supply and hence increased tax revenue)

Estimates MVPF of $1 tax cut at bottom of income distribution of

$\sim$0.88 (through EITC)

Generates $1 in benefits but cost if $1.15 (positive fiscal externality because of increased labor supply in response to the increased tax subsidy)
Figure 8: Using Efficient Welfare Weights for Policy Evaluation

Section 8 Food Stamps JTPA Inefficient Policies Efficient Policies

Efficient Policies

\( 1/g(y) \)

MVPF

Inefficient Policies

JTPA

Section 8

Food Stamps

Notes: This figure illustrates the use of the efficient welfare weights for assessing the efficiency of government policy changes. The line presents the value of \( 1/g(y) \), which represents the amount of welfare that can be delivered to each portion of the income distribution per dollar of government spending. The dots present estimates of the marginal value of public funds (MVPF) for three policy examples: the job training partnership act (JTPA) from Bloom et al. (1997), food stamps from Hoynes and Schanzenbach (2012), and Section 8 housing vouchers from Jacob and Ludwig (2012). The vertical axis presents the estimated MVPF from Table 1 of Hendren (2016); the horizontal axis presents the estimated income quantiles of the beneficiaries of each policy (normalized to 2012 income using the CPI-U). An MVPF that falls above (below) the the Income/EITC line correspond to policies that can (not) generate Pareto improvements.
Efficient welfare weights: estimates (Hendren 2017)

- Transferring (through the income tax) $1 from the top of the income distribution can generate about $0.65/1.15 = $0.57 of welfare to someone at the bottom of the distribution.
- Conversely, transferring $1 from the bottom of the income distribution can generate around $1.15/0.65 = $1.77 of welfare to those at the top of the income distribution.
- Lower MVPF for a tax cut to the poor than to the rich is consistent with an optimal tax system in the presence of a social welfare function that places greater weight on the marginal value of resources for the poor than the rich (e.g. a utilitarian social welfare function).
  - Mirror image of Okun’s (1975) "leaky bucket"
Using MVPF for absolute welfare evaluation

- Thus far have used MVPF for comparative welfare evaluation across policies
- Alternative question: "should" a policy w a given MVPF for a given group be enacted?
  - Requires specifying a set of individual and societal preferences
- Imagine a policy that takes $1 from group B and spends it on a policy directed at group A. ratio of MVPF of the policy aimed at A relative to the one aimed at B reveals implicit welfare weights at which society would be indifferent to this policy
- One approach is to assume the income tax schedule is set optimally / "reveals" a set of implicit social welfare weights
  - Then MVPF of any policy can be judged relative to a tax change for same income group
- Alternatively can specify a SWF
Example: Suppose ratio of MVPFs for directing a $ to group A and taking a dollar from group B is $0.8

- Suppose group A has consumption that is 50% of that of group B.
- "Should" we do that policy?

An MVPF of $0.8 says that every $ of expenditure on the policy generates $0.8 in benefits and $0.2 in "leaks" from Okun’s bucket.

- Assume CRRA utility w/ $\sigma = 3$ (i.e. $u(c) = \frac{c^{1-\sigma}}{1-\sigma}$) so that $u'(c) = \frac{1}{c^3}$
- Marginal utility of consumption of group A is 8 times that of group B

Therefore society would desire a transfer policy from group B to group A with an MVPF of 0.125 or greater

- i.e. would be willing to burn $0.875$ cents to transfer $0.125$ from B to A.
MVPF with multiple beneficiaries

Thus far have considered a policy that targets income group $i$.

- What about a policy that has multiple beneficiaries of different income groups?

Example: welfare analysis of expenditure on public good (e.g. lighthouse)

- Samuelson condition: compare the sum of benefits across people to the cost

$$MVPF_{\text{public good}} = \frac{1}{N} \sum_{i} \eta_i W_i \left(1 + FE\right)$$

where $W_i$ is individual $i$’s WTP out of own income for a $1$ more spending on public good and $\eta_i$ is individual’s social welfare weight.

- Where do social welfare weights come from? Can impose social welfare function. Or use efficient welfare weights as a natural benchmark in searching for Pareto improvements.
Example: welfare analysis of $1 increase in Pigouvian subsidy to correct a positive externality (e.g. vaccine)

\[
MVPF^{Pigou} = \frac{1 + \eta_E E}{1 + FE}
\]

where \( E \) denotes the monetized welfare effects on external parties and \( \eta_E \) denotes the social welfare weight on external parties relative to the infra-marginal recipients (I)

Same would apply to a policy not designed to correct an externality but that has effects on external parties (i.e. non recipients)
MVPF Summary

- MVPF is ratio of benefits (WTP) to costs
- Costs require estimates of causal effects of policy on government budget
  - Any behavioral response that potentially affects public revenue or expenditure needs to be estimated
  - Any behavioral response with no public sector budgetary implications does not
  - Provides guidance for what causal effects are relevant for welfare analysis
- Cash benefits require no further analysis
  - Valued $ for $ by infra-marginal recipients and no net utility impact for marginal recipients via envelope theorem
- In kind benefits: envelope theorem still applies for marginal recipients but need to estimate value for infra-marginal recipients
- Multiple beneficiaries: need to assume a set of (relative) social welfare weights for non-recipients
MVPF: Two key assumptions

- Marginal changes and individuals making (privately) optimal choices
  - These allow us to exploit the power of the envelope theorem
- What if we don’t want to invoke the envelope theorem?
  - Non-optimizing agents or non-marginal changes
- Non-marginal changes:
  - Need additional assumptions or estimates to calculate benefits for marginal recipients
  - e.g. Finkelstein-Hendren-Luttmer (2015): non-marginal expansions of Medicaid
- Non optimizing agents
  - Now may have first order welfare effects for marginal recipients.
  - e.g. Finkelstein-Notowidigdo (2017) on reductions in hassle costs of signing up for means-tested benefit.
Welfare analysis: example

- Garthwaite, Gross and Notowidigdo (QJE 2014): Expansion of Medicaid in TN causes people to exit employment
  - Natural experiment in TN
  - Adults kicked off Medicaid see large increases in employment (and in their employer-provided private insurance coverage)
- Potential implication for ACA: Medicaid expansion could case decreases in employment
- Reporter’s question to me (or generals question to you!): What are the welfare implications of this?
Welfare analysis for job loss due to Medicaid expansion

- First trick to answering welfare questions (or any question): start with an easier question:
  - suppose ACA results in actuarially fair private insurance being available (which it previously wasn’t due to adverse selection) and people drop out of work to take this up?
  - clearly a welfare improvement (previously distorting labor-leisure tradeoff to buy a good that was only available at non-marked up prices through work)

- Medicaid expansion is more complicated
  - It’s free (people taking it up don’t bear cost)
  - There’s an income cap on eligibility

- Hendren’s answer: Welfare cost is lost government revenue (i.e. lost tax revenue on earnings)
  - By envelope theorem, individuals quitting job are indifferent on margin - no welfare consequences
  - Only need to think about external effects on government budget
Other applications

- EITC (see Hendren papers)
- Provision of in-kind goods (Medicaid expansion) - will discuss
- Health Insurance Subsidies for low-income individuals - will discuss
- Policies to increase take-up of in kind benefits - will discuss
Figure 8: Using Efficient Welfare Weights for Policy Evaluation

Notes: This figure illustrates the use of efficient welfare weights for assessing the efficiency of government policy changes. The line presents the value of $1/g(y)$, which represents the amount of welfare that can be delivered to each portion of the income distribution per dollar of government spending. The dots present estimates of the marginal value of public funds (MVPF) for three policy examples: the job training partnership act (JTPA) from Bloom et al. (1997), food stamps from Hoynes and Schanzenbach (2012), and Section 8 housing vouchers from Jacob and Ludwig (2012). The vertical axis presents the estimated MVPF from Table 1 of Hendren (2016); the horizontal axis presents the estimated income quantiles of the beneficiaries of each policy (normalized to 2012 income using the CPI-U). An MVPF that falls above (below) the Income/EITC line correspond to policies that can (not) generate Pareto improvements.