

Public Preferences for Program Tradeoffs: Community Values for Budget Priorities

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A growing literature concerns techniques to improve community-based reforms and citizen-centered governance in order to reinforce the trust in democratic government. We analyze a contingent choice technique that systematically collects information about individual citizens' relative values of a set of state public programs. Individual citizens are asked to allocate a fixed increment of public funds. Individuals reveal their marginal willingness to trade off (MWTTO) additions in one program for additions in another. MWTTO values provide program rankings and information concerning the relative strength of citizen preferences. An example of a contingent choice survey is described.

INTRODUCTION

Despite challenges in estimating public preferences, citizens' values of public programs are often considered necessary inputs to public decisions if the decisions are going to lead to satisfactory provision of publicly provided goods. The purpose of this article is to report results of using a contingent choice technique with public programs. The primary motivation is to enrich the tool kit available to managers who must make decisions about existing public programs and who face a known, fixed budget. The tool might be useful to elected officials and agency decision makers to compare possible budget allocations.

This tool is offered in the context of increased citizen participation in the budgeting process and recognition of what Beckett and King call a transformative movement that incorporates both community-based reforms and citizen-centered governance. The

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failure to involve citizens in a meaningful way may invite backlash and cynicism.¹ Simonsen and Robbins have discussed this transformative movement and some of the more recent methods that attempt to reengage the public in governmental decision making, and they explain the importance of finding techniques that reinforce the trust in and legitimacy of a democratic government while not making that government “more vulnerable to fashion.”² Simonsen and Robbins state that many surveys of government services are flawed because there is no budget constraint, or even cost of service, explicitly included, and they support the use of budget constraint methodology because such methodology is likely to provide decision makers more realistic preferences about complex issues.

The tool developed here will be most useful, as will citizen participation, in situations in which public budget administrators perceive that elected officials to whom they answer are not being bypassed, but rather share the risk as well as the benefit associated with citizen participation.³ Without support from elected officials, citizen participation may well be blocked by barriers such as a public hearing after the budget is set. Current practice tends to blur the sharp distinction between public administrators and elected representatives by involving citizens in budget decisions. Franklin and Carberry-George, for example, analyze government budgetary processes in Texas and find that most governments use decision-making frameworks that reflect striving to combine the politicalness of incrementalism, results emphasis of performance bases, and the maximization of satisfaction associated with using community values.⁴ They find that inclusion of public values is fairly strong in all frameworks.

Our contingent choice technique is in the spirit of McDaniels’s quest for developing approaches that improve the quality of the public preference information available for decision making.⁵ While McDaniels used a structured value referendum, which requires choices among alternatives, we use a budget allocation format, which requires choices among changes in public programs. Citizens are motivated to make informed judgments due to a realization that the results are presented and used by policy makers, and due to civic duty.

Providing actual budget information and requiring respondents to make changes across several relevant government programs is important because, as Simonsen and

1. Julia Beckett and Cheryl Simrell King, “The Challenge to Improve Citizen Participation in Public Budgeting: A Discussion,” *Journal of Public Budgeting, Accounting & Financial Management* 14, no. 3 (Fall 2002): 463–485.

2. W. Simonsen and Mark D. Robbins, *Citizen Participation in Resource Allocation* (Boulder, CO: Westview Press, 2000).

3. Gerald J. Miller and Lyn Evers, “Budgeting Structures and Citizen Participation,” *Journal of Public Budgeting, Accounting & Financial Management* 14, no. 2 (Summer 2002): 233–272.

4. Aimee L. Franklin and Brandi Carberry-George, “Analyzing How Local Governments Establish Service Priorities,” *Public Budgeting and Finance* 19, no. 3 (Fall 1999): 31–46.

5. Timothy L. McDaniels, “The Structured Value Referendum: Eliciting Preferences for Environmental Policy Alternatives,” *Journal of Policy Analysis and Management* 15, no. 2 (Spring 1996): 227–251.

Robbins noted, even in those cases where budget information is provided for only one service, but not put in context with the costs and tradeoffs related to other programs, the very mention of a tax, all else being equal, will bring about less support for that service.⁶ However, Simonsen and Robbins do note ironically that the results of any preference elicitation method that provides the respondents with detailed budget information and forces explicit and realistic tradeoffs will probably not be representative of the preferences of the relatively more ignorant voting public. Furthermore, prospect theory and prospective reference theory both show that, to the extent that respondents are uncertain of the effects of their decisions, their decisions may be affected by the framing of the questions, heuristics, and information availability.⁷ Still, the ability of the policy maker to learn the preferences of an informed portion of the electorate can be important when considering complex issues. Indeed, elected officials often use private surveys to estimate public preferences on budgets.

More recently, Robbins and Simonsen have developed a dynamic method of citizen preference revelation.⁸ They link citizens' willingness to pay for their shares of desired levels of public expenditure to the budget constraint faced by budget managers and elected officials. They do this by having citizen participants build their own balanced budget in which changes in public expenditures are tied to changes in the citizen's tax price. This innovative technique appears to promise much, especially if users can be convinced that strategic behavior such as free riding is not debilitating. There is much to be said in favor of using citizen preferences expressed as individual willingness to pay out of the household budget.

Our contingent budget allocation technique is similar to some simulations that have been developed to ask people to balance the budget. These simulations provide some information about the tradeoffs that citizens and policy makers will need to make to balance the budget. A National Budget Simulation developed by Schneiderman and Newman asks participants to cut the 1995 fiscal deficit in order to achieve a balanced budget.⁹ Funding can be increased in an area, but then larger cuts must be made in other programs. The Kentucky Long-Term Policy Research Center has a Kentucky State Budget Game in which the player must balance the budget after elected to be governor.¹⁰

6. Simonsen and Robbins.

7. W. Kip Viscusi, "Prospective Reference Theory: Toward an Explanation of the Paradoxes," *Journal of Risk and Uncertainty* 2, no. 3 (September 1989): 235–264; and Amos Tversky and Daniel Kahneman, "Advances in Prospect Theory: Cumulative Representation of Uncertainty," in *Choices, Values, and Frames*, eds. Daniel Kahneman and Amos Tversky (New York: Russell Sage Foundation, 2000), 44–65.

8. Mark D. Robbins and Bill Simonsen, "A Dynamic Method of Citizen Preference Revelation," *Journal of Public Budgeting, Accounting & Financial Management* 14, no. 3 (Fall 2002): 445–461.

9. Anders Schneiderman and Nathan Newman, *The National Budget Simulation*, UC-Berkeley's Center for Community Economic Research; available from: <http://www.nathannewman.org/nbs>; accessed 2 December 2003.

10. Kentucky Long-Term Policy Research Center, *Kentucky State Budget Game*; available from: <http://www.kltprc.net/budgetgame/BUDGAME.HTM>; accessed 11 December 2003.

It has the added dimension of being able to raise taxes. Computer-based simulations offer potential, but have not been applied in a way so as to generate a sample of citizens that might be offered as representative. Also, the budget simulations do not provide substantial information about real program costs and benefits, and it is difficult to make logical inferences about participant behavior and motivation.

A characteristic that our technique shares with the budget games is that any allocation is made within a context of implications of allocations for other programs. This feature is especially realistic when budgets are tight and issues are hot. Peters analyzed the response of New Jersey to demands for school finance reform and the implications for state spending priorities and revenue policy.¹¹ He found that budget program categories of “community development and environmental management” and “governmental direction, management, and control” were affected in addition to education.¹² We use the technique to systematically collect information about individuals’ relative values of public programs in a context in which allocations are consistent with a fixed amount.

CONTINGENT BUDGET CHOICES TO ESTIMATE PROGRAM TRADEOFFS

The contingent budget choice technique described in this article is influenced by recent work in contingent valuation for estimating benefits of public goods. Contingent valuation is a survey-based method used in benefit-cost analysis to estimate values of goods that are not typically traded in formal markets.¹³ Choice situations are constructed in which individuals trade off money for the public good and reveal their willingness to pay. Contingent valuation usually entails asking about prior knowledge and attitudes about the public good, description of the public good, how payment will be made, elicitation of the willingness to pay amount, debriefing questions, and personal and demographic characteristics. An important advantage of contingent valuation is that estimates of the economic value of goods not ordinary traded in markets can be obtained. One disadvantage of contingent valuation is potential hypothetical bias in the form of individuals stating that they will pay more than they truly are.

The contingent budget choice technique employed in this article is similar in that we describe the hypothetical choice setting, describe the contingent commodity, pose tradeoff questions from which values will be inferred, and ask questions about the person. Our technique differs in a fundamental way in that we ask the individual to

11. Robert A. Peters, “School Finance Reform’s Impact on New Jersey’s State Spending Priorities,” *Public Budgeting and Finance* 16, no. 3 (Fall 1996): 74–89.

12. *Ibid.*, 88.

13. Richard T. Carson Jr. “Contingent Valuation, Resources and Environmental,” in *International Encyclopedia of Social and Behavioral Sciences*, eds. Neil J. Smelser and Paul B. Baltes (Amsterdam: Elsevier Science, 2001); and Robert C. Mitchell and Richard T. Carson, *Using Surveys to Value Public Goods: The Contingent Valuation Method* (Washington, DC: Resources for the Future, 1989).

allocate a fixed increment to a government budget over the various programs funded by the budget. The budget constraint is clearly described as it is in any contingent market valuation. The budget is a specified, limited change in a public budget. Each individual faces the same budget constraint rather than his or her own personal budget constraint, which is faced in making personal consumption choices. The distinction is that individuals are not making tradeoffs between public program areas and their personal consumption of private goods. We are not able to determine their marginal willingness to pay for the public programs.¹⁴ However, the specified, limited increment to the public budget leads individuals to consider the intensity of their preferences for the various public programs before allocating shares of the increment to the programs.

Our contingent choice leads individual citizens to reveal their marginal willingness to trade off additions to one public program for additions to another, competing public program, given the specified budget. The marginal willingness to trade off (MWTTO) value between any two program categories is the ratio of the contingent choice increments to the two categories. MWTTO between any two budget categories, j and k , is the ratio of the allocations to the two categories:

$$\text{MWTTO}_{jk} = a_j/a_k \quad (1)$$

where a_j and a_k are allocations to the different budget categories. For example, if the allocation to education category a_j is 18.0 and the allocation to health care category a_k is 12.1, then the MWTTO of health care programs for education programs is 1.5. This implies the individual wants relatively more in the education budget category.¹⁵

The contingent budget choice approach elicits public attitudes about program resource decisions and provides one way to determine people's general preferences for, and satisfaction with, each possible budget program, relative to all others. An advantage of the relative values elicited by the contingent choice technique is not only that the programs can be rank ordered by priority, but also that they can be compared with respect to relative importance. In other words, a change in a program may be ranked

14. Ingemar Eckerlund et al., "Value for Money: A Contingent Valuation Study of the Optimal Size of the Swedish Health Care Budget," *Health Policy* 34, no. 2 (November 1995): 135–143. In this paper, the authors analyze the optimal size of the public health care budget in Sweden using contingent valuation to estimate how much individuals are willing to pay in higher taxes for more health care. The tradeoff they present is a tradeoff between public expenditures and individual personal consumption by individuals facing their own budget, or income, constraints.

15. Assume each respondent decides how much of the budget to give to a particular budget category by maximizing his or her utility. To do this, the respondent equates the marginal utilities per dollar spent for all budget categories. The marginal utility for a particular budget category could be disaggregated into $\delta U/\delta a_i = \delta U/\delta s_i \cdot \delta s_i/\delta a_i = \delta U/\delta s_i \cdot q_i$ where $\delta u/\delta s_i$ is the marginal utility a unit of government services and $\delta u/\delta a_i = q$ is the "productivity" of government, or the ability of government to convert dollars into government services. A respondent who believes a program is "effective," or has accomplished its goals, will have a smaller marginal utility for a new unit of that service than he or she would for a program that he or she believes in currently less effective, and therefore would allocate less to that particular program.

above a change in another program and be valued twice as much. Public managers could welcome this information.

MWTTO information can be a useful complement to other types of information decision makers typically get. Public decision makers get lobbied by interests desiring agencies to act as if there were no limit to agency resources. People who want more of everything are not helpful to decision makers with limited staffs and funds. Decision makers occasionally get priority information that ranks the problems that need attention. However, the rankings do not give guidance on how much should be spent on the top priority before moving to the second priority. For example, National Priority Rankings for cleaning up Superfund sites have led to the problem of most of the expenditures being devoted to just a few sites at the top of the priority list and little devoted to many other sites on the list.¹⁶

Interestingly, research in this area involved referendum surveys. In 1963, Mueller conducted a national survey to identify attitudes toward fiscal policies and compared the results to voting preferences.¹⁷ Mueller found that while attitudes toward reducing taxes were unrelated to party affiliation, there were distinct differences along party lines concerning programs on which the taxes were to be spent. She did not get MWTTO information.

A SURVEY OF CONTINGENT BUDGET CHOICES

To create a random sample for the contingent budget survey, a combination telephone and mail survey approach was used. Funding constraints precluded the use of more expensive methods such as personal interviews. Questionnaires were designed to motivate people to consider the choices state government must make with respect to resources. People were asked to act as if they were the decision makers and to make hypothetical allocation decisions regarding government budgets. They were also asked to provide socioeconomic information.

Survey Format

In the basic format employed in the mail surveys, people were given the opportunity to make choices concerning the allocation of “extra” state resources, in the form of revenue, to various governmental program areas. The extra state revenue that respondents were asked to allocate was to be in addition to any state money already allocated to the programs. If the respondents allocated no revenue to a particular

16. John Hird, “Environmental Policy and Equity: The Case of Superfund,” *Journal of Policy Analysis and Management* 12, no. 2 (Spring 1993): 323–343.

17. Eva Mueller, “Public Attitudes toward Fiscal Programs,” *Quarterly Journal of Economics* 77, no. 2 (May 1963): 210–235.

program, that program's funding was to be frozen at current levels. Focus groups were used in pretesting all questionnaires.¹⁸

People were asked to make hypothetical choices regarding government program budgets. Thirteen program areas were chosen to roughly represent state program categories with the greatest funding through the Kentucky State Executive Budget. People were asked to allocate an extra \$100 million over these areas. Figure 1 shows the budget choices elicitation page for this overall budget.¹⁹

Sampling Method

A random digit dialing procedure was used in initial phone surveys of Kentucky households. The random digit dialing procedure gave each household with a phone an equal probability of being contacted. Two surveys were conducted and combined. In the first survey, the University of Kentucky Survey Research Center was contracted to draw a random sample of at least 600 people from the target population who would be willing to participate in a mail survey. In the second survey, the University of Kentucky Center for Business and Economic Research contacted approximately 1,000 people from the target population. The use of combination phone/mail surveys is useful in increasing response rates and in determining the extent of nonresponse bias and sample selection bias.²⁰

Telephone and Mail Survey Response

During a seven-day period beginning November 3, 1995, as part of "A Survey about Budget, Environmental, and Health Choices," the UK Survey Research Center contacted 807 households by telephone. Of the 807 contacts, 701 (87 percent) agreed to participate in a mail survey and provided their names and addresses. During a four-week period beginning April 20, 1997, as part of "A Survey about Budget Choices and Effectiveness," the UK Center for Business and Economic Research contacted 1,322 households. Of these, 1,051 (80 percent) agreed to participate in a mail survey. Combining the results of both surveys, there were 1,752 respondents agreeing to participate in a mail survey, meaning only 18 percent of the respondents contacted in either of the phone surveys refused to participate in the mail survey. Of these agreeing respondents, 40 percent were obtained in the first survey and 60 percent were obtained in

18. Two focus groups were conducted for each survey: Survey #1 (September 1995, Natural Resources and Environmental Protection Cabinet [NREPC], Division of Water employees and University of Kentucky undergraduates); Survey #2 (March 1997, NREPC Division of Water employees and University of Kentucky Center for Business and Economics Research employees).

19. For complete copies of the survey instruments, see the NREPC, Division of Water, Frankfort, Kentucky. For complete copies of the survey instruments, contact the authors.

20. Don A. Dillman, *Mail and Telephone Surveys—The Total Design Method* (New York: Wiley, 1978).

FIGURE 1
Overall State Budget Choices Page

CHOICES FOR KENTUCKY'S OVERALL STATE BUDGET

Please consider the budget categories below. If you were making the choices for the state of Kentucky and an *extra \$100 million* were available to be added to the existing budgets, **how much of the \$100 million would you put in each of the following program areas?** If you put more money into a given area, the programs in that area will be expanded. If no money is allocated to a given area, programs will be frozen at current levels. The total should add up to 100.

- AGRICULTURE:** Animal health, livestock services, and pest management
- CULTURAL INSTITUTIONS:** State libraries, arts and humanities, museums, and historical societies
- ECONOMIC DEVELOPMENT:** Industrial development, marketing information, community and regional planning, housing, and buildings construction
- EDUCATION:** Public elementary, middle, and high schools, Kentucky Educational Television, state universities, community colleges, and student loans
- ENVIRONMENT:** Air and water pollution prevention, waste management, mining and minerals, forestry, conservation, and energy efficiency
- FINANCE AND REVENUE:** Investment and debt management, computer information systems, property valuation, taxation, and collection
- HEALTH CARE:** Medicare, Medicaid, county health departments, mental health services, and services for the disabled
- HUMAN RESOURCES:** Social services, food stamps, and aid to families with dependent children
- JUSTICE:** Jails and correctional systems, state police, and the courts
- LABOR AND WORKER'S COMPENSATION:** Occupational safety and health, and payments to workers suffering job-related injuries and diseases
- NATIONAL GUARD:** Military affairs, veterans affairs, and disaster relief
- TOURISM:** State parks, fish and wildlife programs, and the state fair
- TRANSPORTATION:** Highway construction and maintenance, airports, and public transportation

100 TOTAL <<Please check to see that your total is equal to 100>>

Source: 1995 Contingent Budget Survey of Kentuckians.

the second survey. Overall, the response rates were good, given the negative response of households to telemarketing.²¹

Each person who agreed to participate was sent a mail survey. Mail survey procedures generally followed Dillman's total design method, with follow-up mailings, including a replacement questionnaire.²² In the original mailings (Survey #1: November 13, 1995; Survey #2: May 20, 1997), each questionnaire was mailed with a cover letter, a stamped and labeled return envelope, and a one-dollar bill as appreciation for participation.²³ Follow-up cards were sent to each of the mail survey participants (Survey #1: December 13, 1995; Survey #2: June 20, 1997) thanking them for their participation and asking them to write or call if they had not responded and needed another copy of the questionnaire. The follow-up mailing was sent to each mail survey participant who had not returned a survey (Survey #1: January 30, 1996; Survey #2: July 15, 1997). The follow-up survey was mailed with a cover letter and a stamped and labeled return envelope. In the first survey, the last questionnaire returned was received on April 19, 1996. In the second survey, the last was received on December 1, 1997. The total number of replies was 990, or 56 percent of all surveys mailed.

Sample Representativeness

The socioeconomic characteristics of the 990 respondents returning mail surveys can be compared to the average socioeconomic characteristics of the state population as estimated by the U.S. Census.²⁴ Seven characteristics were compared in this way and the results are found in Table 1. Those respondents returning mail surveys and providing budget values tended to have higher incomes (\$41,6000 vs. \$24,800 in 1996 dollars), more formal education (51.3 percent vs. 36.9 percent with at least some college), and be more likely to vote than the general state population (76.5 percent vs. 59.3 percent of registered voters voting in general elections).

Because some socioeconomic information was captured in the telephone survey it was possible to compare the people who agreed to participate in the mail survey to those people who refused to participate. For many characteristics no statistically significant difference was found.²⁵ We did find that those agreeing are more likely to be employed

21. In addition to the regular versions of the second mail survey, a random sample of 220 respondents agreeing to participate in a mail survey was sent surveys requesting respondents to allocate a tax cut over all the categories. Of these 220 respondents, 120 returned mail surveys, providing us with decrement allocations, as opposed to the increment allocations in the regular survey. The results of these decrement surveys were consistent with the increment results, but because of difficulties in combining the decrements and increments in a mathematically meaningful way, the results are considered separate and are not included in this article's analysis.

22. Dillman.

23. The dollar bills were from private funds through the Carl F. Pollard Professorship.

24. Department of Commerce, U.S. Bureau of the Census. *Statistical Abstracts of the US: 1995* (Washington, DC: 1995).

25. Variables that were tested, but which showed no significant differences across the two types of respondents included: Farm/Nonfarm/Rural Residence, Live in Kentucky All-Life, opinion of Overall Government Effectiveness, opinion of State Environmental Program Effectiveness, and Age.

TABLE 1
Comparison of Respondent Characteristics to U.S. Census Statistics for Kentucky

	Budget Survey Variable	Census Statistic
Age (years)	48.0	47.8
Income (1996 \$1,000)	41.6	24.8
Race (% White)	92.2	92.0
Education		
% Less than High School	11.8	32.9
% High School	36.9	30.2
% College	39.6	31.2
% Graduate	11.7	5.7
Registered to Vote (% Yes)	88.2	87.6
Vote Nov. General Election (% Yes Given Registered)	76.5	59.3
Physiographic Region (%)		
Blue Grass	43.2	48.0
Eastern Coal Fields	22.5	16.4
Embayment	5.6	5.7
Plateau	17.7	23.0
Western Coal Fields	11.1	6.9

Sources: The state population averages are from 1990 Census Data from the Kentucky State Data Center, Urban Studies Institute, University of Louisville, and the 1995 Statistical Abstract of the U.S., U.S. Bureau of the Census. The Voter Registration information was obtained from the Kentucky State Board of Elections World Wide Web site available from: <http://www.sos.state.ky.us/index/main/elecdiv.asp>; accessed 11 December 2003. Because survey respondents were required to be 18 years of age or older, the age used for the State Population average is for Kentucky residents above 18 years old. Because survey respondents were asked their household income for the previous year in two surveys conducted two years apart, the income used for State Population average is 1990 Census Data (1989 income), corrected to 1996 using the CPI-U from the Bureau of Labor Statistics.

Source: 1995 Contingent Budget Survey of Kentuckians.

and to have voted in the last general election. Also, based on the phone survey characteristics, comparisons were made for people who did and people who did not return a mail survey after receiving one. Respondents returning surveys tend to be older, have more formal education, and have voted in the last general election.²⁶

Public officials use a variety of sources of information. These MWTTO values can be helpful to public decision makers in that they are more representative than many other

26. More socioeconomic information was elicited from those respondents agreeing to participate in a mail survey. Variables that were tested, but which showed no significant differences across the two types of respondents included: Sex, Farm/Nonfarm/Rural Residence, Live in Kentucky All-Life, opinion of Overall Government Effectiveness, opinion of State Environmental Program Effectiveness, whether or not they Contribute to Nature Funds, whether they have an Environmental Issue Concern, Registered to Vote, Currently Employed, Government Employee, and Physiographic Region.

alternative sources of information about citizen preferences and they reveal more information about relative values than priority lists. Public decision makers may well be more interested in the values of people who are more likely to vote, as we get from our survey. Nonetheless, average differences between the survey samples and the state population as a whole should be kept in mind.

RESULTS

Estimated MWTTO Values

The average (mean) allocations to each of the 13 overall budget categories are found in Table 2.²⁷ A t-test of significance was used to determine whether or not each category was ranked significantly lower than the category just above it.

Education and health care are valued highly. On average, people allocated \$18.0 million of the given \$100 million budget surplus to education. They allocated \$12.1 million to health care. Not surprisingly, these budget categories have been the recipients of a sizable share of state tax revenues. Environment, transportation, justice, and economic development were the next most highly valued categories. Allocations for these categories ranged from \$8.7 million for environment to \$7.5 million for economic development. For those categories ranked below justice, people allocated less than the amount that would be budgeted if the budget had been equally divided among the 13 categories. Of this group, economic development received the largest allocation and was ranked significantly higher than the other categories. Finance and revenue received the smallest allocation and was ranked significantly lower than the other categories. Additional money to education was valued 1.49 times as much as additions to health care and 5.3 times as much as additions to finance and revenue.

The relatively large share devoted to education probably reflects the intense interest that produced the Kentucky Education Reform Act and related changes in the early 1990s before the survey. Petrosko, Lindle, and Pankratz review the extensive impact of this reform.²⁸ Education is still a prominent political issue that gets widespread news coverage. In the most recent Kentucky state budget, education fared well compared to other areas.

27. In the 6 percent of the returned mail surveys where the respondents did not include the full \$100 million in allocations, we pro-rated the responses (as a fraction of the total they did allocate) over the full \$100 million before averaging with the other responses. In a different part of the survey, we asked respondents whether they would rather not spend the extra money, but instead have a decrease in next year's taxes. Twenty-three percent of the respondents would rather have reduced taxes, but this preference was not correlated significantly with failing to allocate the full \$100 million.

28. Joseph M. Petrosko, Jane Clark Lindle, and Roger Pankratz, *Executive Summary of 2000 Review of Research on the Kentucky Education Reform Act* (Kentucky Institute for Education Research, Lexington and Louisville, KY: University of Kentucky/University of Louisville Joint Center for the Study of Educational Policy, 2000).

TABLE 2
Choices for Kentucky's Overall State Budget, \$100 Million Increment

Budget Category	Mean Allocation (\$ Millions)	Standard Deviation	Coefficient of Variation
Education	18.0	13.1	0.73
Health Care	12.1	8.2	0.68
Environment	8.7	8.1	0.93
Transportation	8.6	7.9	0.92
Justice	8.2	9.0	1.10
Economic Development	7.5	7.6	1.01
Human Resources	5.7	7.0	1.23
Agriculture	5.6	5.1	0.91
Labor & Work. Comp.	5.2	5.5	1.06
Tourism	5.1	4.9	0.96
National Guard	4.4	4.6	1.05
Cultural Institutions	4.0	4.3	1.08
Finance and Revenue	3.4	4.6	1.35

Notes: 1. The shaded spaces between rows separate mean allocations, which are significantly different from each other at the 0.95 level. The t-test is conducted for equality between each category and the next higher category.
 2. All categories above the double line receive more than the average allocation (\$7.69 million) for all categories. All categories below the double line receive less than the average allocation.
 3. Coefficient of Variation = Standard Deviation/Mean. Total Allocation = \$100 million.
 4. n = 440.

Source: 1995 Contingent Budget Survey of Kentuckians.

Coefficients of Variation: Respondent Agreement

The average allocations for the budget categories are a measure of the respondents' preferences concerning expanding each program area relative to other program areas, given the current level of funding.

The coefficient of variation (C.O.V.) for each budget category is a measure of the divergence of interest among respondents concerning a particular budget category. So, the lower the value of the C.O.V., the greater the agreement about the relative value of a program. Table 2 provides a list of C.O.V.s for all of the 13 categories. Greater agreement is apparent for the largest allocation, education (0.73), compared to the smallest allocation, finance and revenue (1.35). Greater agreement exists among the top three program areas, education, health care, and environment (average of 0.78) than

among the bottom three program areas, National Guard, cultural institutions, and finance and revenue (average of 1.16).

TESTING THE CONTINGENT CHOICE TECHNIQUE

Simple Tests of Random Values

One indication of successful revelation of individual preferences for changes in the provision of the publicly provided goods given a fixed public budget is that they are not random. We test two ways whether or not the hypothetical allocations within the budgets are significantly different than what would be expected if the allocations had been made randomly. Each test compares the average (mean) observed allocations against the allocations that might be expected to occur in random choice.

In the first test, each observed average allocation was tested to see whether it was significantly different from the simple average allocation. The simple average, or across-the-board, allocation was \$7.69 million, \$100 million divided evenly across the 13 budget areas. T-tests were used to compare observed mean allocations against this simple average allocation. The mean observed allocation was found to be significantly different from the simple average allocation at the 0.95 level. This is a weak indication that individuals are valuing the program categories, and not simply randomly allocating the budget.

In the second test, the distribution of average observed allocations was tested to see whether it is significantly different than the normal distribution. A significant difference provides additional assurance that the survey is measuring relative preferences for the various budget categories. The Shapiro-Wilk test was used to test the distributions of mean observed allocations. The distribution was found to be significantly different from the normal distribution at the 0.95 level. This is an indication that the individuals are not only ranking the categories, but are considering the strengths of their preferences.

A Reliability Test—Effectiveness

One way to test for reliability of the budget choice values is to ask a closely related question and check for similarity of results. A subsample of the respondents, respondents to the second mail survey, was asked to rate the effectiveness of each program category. Effectiveness was defined in the questionnaires to be “how well a task or goal is accomplished.”

Based on their own experiences and knowledge, respondents could rate each category as “not effective,” “somewhat effective,” or “very effective.” Recall that the budget choices responses point to programs to which people want more resources directed. They want more money devoted to the program because they want more progress toward the policy goal. So, in this context, a program that has not accomplished as much as people want will be rated as “not effective.”

Table 3 shows the effectiveness ratings for program areas of the state budget. The categories are listed in the table by average effectiveness, based on assigning the numbers

TABLE 3
Effectiveness Ratings for Kentucky's Overall State Budget Programs

Budget Category	Not Effective (%)	Somewhat Effective (%)	Very Effective (%)	Average Rating
Tourism	5.7	46.4	47.9	2.42
National Guard	6.6	48.6	44.8	2.38
Cultural Institutions	9.6	52.9	37.5	2.28
Universities	8.8	61.9	29.3	2.21
Agriculture	5.2	69.9	25.0	2.20
Economic Develop.	17.4	61.2	21.5	2.04
Transportation	19.8	61.4	18.8	1.99
Human Resources	22.4	56.2	21.4	1.99
Health Care	24.1	54.9	21.0	1.97
Schools	24.4	55.4	20.2	1.96
Labor/Work. Comp.	20.6	63.5	15.8	1.95
Education	19.4	67.7	12.9	1.94
Finance & Revenue	23.1	61.4	15.5	1.92
Environment	28.4	58.5	13.1	1.85
Justice	30.7	55.5	13.7	1.83

Notes: 1. These categories are ranked by the Average Effectiveness Rating (using not = 1, somewhat = 2, and very = 3).
 2. The spaces between rows separate Effectiveness categories, which are significantly different from each other at the 0.95 level. The t-test is conducted for equality between each category and the next higher category.
 3. In some surveys, Education replaced the separate Schools and Universities categories. In those surveys, respondents tended to rank the Education category lower than either Universities or Schools alone.
Source: 1995 Contingent Budget Survey of Kentuckians.

1, 2, and 3 to not effective, somewhat effective, and very effective, respectively. The weighted average effectiveness rating is shown in the right-most column. They are listed from the most highly rated at the top to the lowest rated at the bottom. cursory glances at this table and back at Table 2 for the budget choices indicate that the effectiveness rating for any particular budget category tends to be inversely related to the budget allocation it received. In other words, the lower the perceived effectiveness, the larger the amount allocated to the category.

Education was given \$18.0 million (of \$100 million), which is the largest amount, but the effectiveness rating for education was only 1.94, which is only slightly greater than the lowest. The correlation between the amounts allocated by individuals and the effectiveness ratings is -0.44 .²⁹ The negative correlation between the budget values for

29. There is another indication that effectiveness varies inversely with the value of additional money to a program. If effectiveness is included as an explanatory variable in a seemingly unrelated regression analysis

programs and the effectiveness rating is an indication that the budget choice elicitation is reliable. If people think a goal is met (highly effective), they allocate little additional money to it. A budget program to which additional resources are valued highly gets a low effectiveness rating because people want more progress.

Tests for Effects of Personal Characteristics

Another test for randomness of elicited MWTTO values is to estimate the increment devoted to a particular program as a function of questionnaire format aspects and personal characteristics of the respondents. One last test is that some systematic relationship between personal characteristics and the values should exist; they should not be random. Because allocating more to one program necessarily implies less will be allocated to other programs, seemingly unrelated regression analysis is used. For any particular budget category the equation estimated is

$$a_j = \sum \beta_m X_m + \varepsilon_j \quad (2)$$

where a_j is the allocation to budget category j ; X_m are factors that explain budget allocations including personal characteristic, location, and survey control variables; and ε_j is an error term. The effect of any particular explanatory factor, X_m , is given by the estimate of its coefficient, β_m . The coefficients are reported for percentage changes.

Table 4 shows the differences in allocations to the state budget categories that can be attributed to various socioeconomic variables. The table is written in percentage terms, derived from regression coefficients, to make it easier to compare the relative effects of various changes. The percentage change in allocation gives the percentage increase or decrease in the allocation that would occur if the continuous variable were to increase by 10 percent. For example, consider the Income variable. The 1.7 found in the Education column and the Income row tells us that a 10 percent increase in income will be associated with a 1.7 percent increase in allocation to education, if all other variables are held constant.³⁰

Table 4 provides information both down each column and across each row. Looking down the Education column in the table it is possible to see how each variable is associated with allocations to education. Looking across the Income row it is possible to see how a 10 percent increase in income would affect allocations to various budget categories.

Those percentages in Table 4 followed by an asterisk (*) measure particularly significant socioeconomic effects on individual budget categories. For the program area Education, for example, the effect of a 10 percent increase in a person's schooling is an increase of 4.8

(footnote continued)

of budget choices, its effect is found to be significantly negative in explaining allocations across all categories in every budget at the 0.95 level. This negative coefficient shows that the inverse relationship between value and the measure of effectiveness, which is seen in the simple correlations reported above, exists even when the other factors in the regression are held constant.

30. This means that the allocation to education is increased by 1.7 percent of its base value. It does not mean that the amount allocated to education is increased by 1.7 percent of the overall budget.

TABLE 4
Changes in Socioeconomic Variables and Overall State Budget Choices

Respondent Characteristic	Resulting Percentage (%) Change in Each Budget Category												
	Edu	Health Care	Envir	Trans	Just	Econ Dev	Hum Res	Agr	Labor/Work C	Tourism	Nat Guard	Cultur Inst	Fin & Rev
Age, 10% Increase in Years	-0.3	0.5	1.5	1.3	0.1	-1.4	-0.3	-3.1*	0.6	0.3	0.2	-2.0	1.0
Male, Instead of Female +	-9.4	-15.5*	11.7	29.5*	3.1	27.0*	-18.1	-10.9	-4.6	22.9*	-6.3	-12.5	-0.4
Non-White, Instead of White	-1.5	35.5*	-18.3	-25.2	-19.3	6.6	9.8	9.5	33.2	-29.1	3.6	-26.1	13.2
Married, Instead of Not	-6.5	10.5	-6.0	-0.6	18.8	9.7	-3.3	4.9	-0.4	0.6	3.7	-33.5*	-8.6
Having Children, Instead of Not	8.9	-15.9*	3.2	0.9	-6.5	9.0	-5.4	-10.7	14.4	9.4	-5.1	-15.6	6.1
Education, 10% Increase in Years +	4.8*	-2.8	-2.4	-0.7	-0.5	5.9*	-4.8	-1.4	-10.0*	1.6	-3.3	1.6	0.1
Income, 10% Increase in \$ +	1.7*	-0.4	0.1	-0.2	-0.7	0.2	-0.8	-1.6*	-2.0*	0.2	-1.9*	1.5*	-0.9
Region, Base: Bluegrass +													
Eastern Coal Fields	-0.1	5.1	-11.8	10.2	-27.6*	6.7	-5.2	-7.9	12.7	9.2	18.6	2.5	-6.4
Embayment	3.5	7.6	-18.8	12.6	19.1	-14.4	-20.9	25.8	-19.0	23.7	-3.9	-33.4	-17.3
Plateau	9.4	2.3	-21.9*	30.4*	-6.8	-16.3	-36.7*	13.5	7.1	-10.7	20.5	4.1	-32.1*
Western Coal Fields	-1.5	6.6	-13.0	26.8*	16.7	-1.4	-5.7	-17.8	3.1	-10.8	9.1	-5.1	-41.8*
Residence, Base: Nonfarm Rural +													
Farm	1.3	-8.8	-21.5*	24.3*	19.8	-13.7	-12.7	23.3*	-10.9	-4.1	-0.4	-15.1	21.9
Urban	-1.4	-8.8	-6.7	21.6*	22.8*	-0.3	-24.2*	8.9	-18.3	-2.6	-3.6	8.2	6.1
Living in Kentucky All-Life, Instead of Not	6.4	4.9	-21.8*	-0.1	13.7	1.0	-9.4	6.7	-13.3	0.3	-9.7	-2.4	1.5
Nature Funds Contributor, Instead of Not													
Enviro. Health Concern, Base: Low													
Medium													
High													
Health Condition, Base: Excellent +													
Average		3.1											
Poor		0.0											
County Crime Rate, 10% Increase in Rate													
Survey Control Variables													
Survey #2 (1997) Used	10.9	7.9	-26.0	3.1	-22.0	-3.3	34.2	-42.2	22.1	-28.5	-1.6	33.3	-1.9
Reverse Order of Categories Used	-3.7	-3.2	-6.3	6.1	14.7	-13.6	-4.8	6.0	-4.3	13.4	2.7	7.0	7.8
No Category Heading Used	20.3	-17.2	13.5	61.0*	7.6	11.2	-34.0	-43.7	-12.3	10.7	-18.6	-50.7*	-26.2
School-University Categories Used	10.9	-22.8	19.4	-9.1	15.1	-26.6	-30.2	25.7	-43.5	31.7	24.9	-9.2	16.1
Budget Information Provision, Base: None													
State Budget Information +	68.7*	16.7	-11.9	-48.9*	10.8	-17.3	-3.1	-80.5*	-39.1	-22.2	-75.4*	-39.0	2.9
Federal Budget Information +	12.0	38.3*	-13.9	27.8*	-4.6	-1.1	-18.7	-13.4	-18.6	-34.1*	-53.1*	-30.6*	-18.5
R ²	0.17	0.11	0.08	0.10	0.06	0.07	0.04	0.08	0.13	0.04	0.06	0.06	0.02

Notes: 1. These percentage changes (elasticities) in allocations are evaluated at the mean allocation for each program area and at the mean value for each continuous socioeconomic variable.
 2. The symbols and+ designate those values that are significant at the 0.95 level. The symbol* is placed after any elasticity value significant in an individual regression on a single budget category. The symbol+ is placed after any socioeconomic variable significant in the seemingly unrelated regression over all budget categories.
 3. n = 677.
 Source: 1995 Contingent Budget Survey of Kentuckians.

percent in the allocation to the Education budget category. A 10 percent increase in income, increases the allocated amount by 1.7 percent. These increases are significant at the 0.95 level. Those socioeconomic variables in Table 4 followed by a plus symbol (+) are considered to be particularly significant in explaining respondents' decisions in allocating the budget across all categories. For example, an individual's schooling is associated with different budget allocations to all program areas and is significant at the 0.95 level.³¹

Test for Effects of Survey Format

Innocuous differences in format should not influence MWTTO values. The variables used in the seemingly unrelated regression analysis included survey control variables. Survey control variables were used to control for different types of bias that might have been unintentionally induced by the questionnaire format. Split-sample surveying allowed testing for several potential sources of bias.

In Table 4, the variable Survey #2 equals one if the value is from Survey #2 and zero if the value is from Survey #1. It was not found to be significant at the 0.95 level across all budget categories in either budget.

The variable, "reverse order of categories," captured information concerning whether or not particular responses were collected in forward or reverse alphabetical-ordered surveys. The order of categories was not found to be significant. This is an indication that respondents take particular care in considering each category in the survey, and are not biased by order in the list of categories.

The variable, "no category headings," was used in the "seemingly unrelated regression." This variable was not found to be significant at the 0.95 level across categories. This is an indication that respondents are not terribly influenced by the "labels" applied to the budget categories.

The variable School-University Categories was used to indicate that responses were drawn from survey formats that used the categories Schools and Universities instead of the single category Education. The allocations given to schools and universities were added together and were considered the same as the single allocation for education in the regressions. As might be expected, for those responses coming from questionnaires with the split categories, the summed allocation going to education was greater. However, it was not significant in explaining allocations to education. Indeed, the variable was not found to be significant in explaining allocations across all categories at the 0.95 level.

31. While it is interesting to think about theories that would lead us to expect certain relationships between respondent personal and location characteristics and allocations to various budget categories, this study was conducted in the spirit of exploration with a new budget choice technique. The R^2 's for the individual budget category regressions might seem low in comparison to data analyzed across time or at a more aggregate level, such as data collected at state level, but the R^2 's are typical of the results from analyzing individual, "micro" data, where idiosyncratic factors are clearly present.

If people have perfect information about the current budget, well-defined preferences for increments (MWTTOs), and are not influenced by starting points offered to them, then providing budget information should have no effect on the MWTTOs elicited. We tested for the effect of budget information. We used a split sample to provide two types of budget information: (1) program area share of state funds and (2) program area share of state budget including federal funds to the state. The information provided for the combined budget is shown in Figure 2. Similar information was provided for the state funds only to another part of the sample. After considering the current budget information as found in Figure 2, respondents were requested to continue to the next page where they were asked to allocate resources in a manner similar to that found in Figure 1. The allocations from respondents who received budget information could then be compared to the allocations from the respondents who did not receive the budget information.

The survey control variables State Budget Information and State and Federal Budget Information were both found to be significant at the 0.95 level in explaining allocations across all categories. This result is consistent with people having imperfect information about the current budget. The resulting percentage changes can be found in Table 4. For example, the 68.7 percent found in the Education column indicates that state budget information provision increases the allocation to education by 68.7 percent over the allocation that would be given in the absence of such information. Including state budget information had a negative effect in explaining contributions to transportation, agriculture, and the National Guard. In Figure 2, it can be seen that education received a large share of state funds, while transportation, agriculture, and the National Guard all received small shares. This may be an indication that respondents use budget information to “anchor” responses.

Including state and federal budget information as part of the questionnaire had a particularly positive effect on the allocations to health care and transportation. It had a particularly negative effect on allocations to tourism, the National Guard, and cultural institutions. In Figure 2, it can be seen that this is in line with actual state and federal budget shares.

There is another indication that people had imperfect information about current budget shares. For a subsample, we asked people to report the shares they think each category has in the current budget. People were presented information like that found in Figure 2, without numbers. Table 5 shows the difference between respondent perceptions and reality with regard to federal and state budget shares. The pattern is that people tended to spread the budget more evenly than it is actually spread. People perceived too little for the program areas with large shares and too much for the program areas with small shares. The range of perceived percentages is from 3.8 to 13.1 while the range of the actual percentages is from 0.1 to 29.6. The difference between perception and reality ranged from -19.8 for health care to -0.5 for justice. While the perceptions are

FIGURE 2
Choices for Kentucky's Overall State Budget

Funds for Kentucky state government programs come from both state and federal taxes. The 14 categories of programs from the Kentucky overall state budget are listed below. In 1996, funds from state and federal taxes for these budget categories totaled **\$12.1 billion**. The percentage of this total budget for each category is also provided below. Carefully look over these percentages and then go on to the next page.

Budget Category	% of State and Federal Funds
Agriculture	0.14
Cultural Institutions	0.25
Economic Development	0.65
Environment	1.29
Finance and Revenue	2.73
Health Care	29.62
Human Resources	6.69
Justice	2.92
Labor and Worker's Compensation	1.55
National Guard	0.39
Schools	23.47
Tourism	1.18
Transportation	12.88
Universities	16.24
Total	100.00

Source: 1995 Contingent Budget Survey of Kentuckians.

TABLE 5
State and Federal Budget Shares (Perceptions and Reality)

	Actual Percentage of Total Budget	Perceived Percentage of Total Budget	Difference in Perceived and Actual Percentage	Actual Ranking	Perceived Ranking
Health Care	29.6	9.8	- 19.8	1	2
Schools	23.5	13.1	- 10.4	2	1
Universities	16.2	8.6	- 7.6	3	5
Transportation	12.9	9.5	- 3.4	4	3
Justice	6.7	6.2	- 0.5	5	7
National Guard	2.9	5.8	2.9	6	10
Labor & Work. Comp.	1.6	5.3	3.7	7	11
Finance and Revenue	2.7	6.2	3.5	8	8
Environment	1.3	4.8	3.5	9	13
Tourism	1.2	5.0	3.8	10	12
Economic Development	0.7	6.3	5.6	11	6
Human Resources	0.4	9.2	8.8	12	4
Cultural Institutions	0.3	3.8	3.5	13	14
Agriculture	0.1	6.2	6.1	14	9

Note: This table is for the version of the Kentucky overall budget, which separates Schools and Universities.
Source: 1995 Contingent Budget Survey of Kentuckians.

imperfect, people are not totally ignorant of the budget shares. The mean of the actual percentage is 7.15 and the mean of the perceived percentage is 7.13. The correlation between actual percentage and perceived percentage is 0.79 and the average error in perceptions was only 5.9.

SUMMARY AND CONCLUSIONS

In this article, we add to the growing literature concerning survey techniques that aid public decision makers in obtaining information concerning the public's preferences for government programs. In particular, we describe a contingent budget choice technique that requires respondents to allocate a hypothetical public budget surplus among various public program categories, allowing calculation of the marginal willingness to trade off (MWTTO) among program categories. The results of an actual contingent budget choice survey applied to a random sample of people in Kentucky for choices in the overall state budget provide some idea of the technique's usefulness: the self-selection of respondents can lead to elite, yet useful, responses; the results still appear to be valid and reliable; the provision of budget information to respondents makes a difference in the allocations;

and the collection and analysis of respondent socioeconomic characteristics can provide the policy maker with useful information.

Of the 2,129 people contacted by phone, 990 (47 percent) agreed to participate and returned completed mail surveys. Compared to census data for the population, our respondents had more formal education and income. Respondents also were more likely to have reported that they voted in the last general election. Responses to our mail survey, therefore, might be considered to come from an elite portion of the population. The policy maker is gaining information from a wealthy, educated, and voting portion of the population, who might be considered influential in the political process. However, if a more representative sample is desired, the difficulty of self-selection can be in part overcome by eliciting values from a representative sample and using the survey results in addition to information from groups that present their preferences through forms such as public hearings, petitions, or lobbying. We could envision putting the contingent budget choices on notebook computers and doing mall intercept surveys at representative sites.

Indications of the validity of the technique are that the responses are not strictly random. People did not simply allocate across the board. Estimates of budget allocation functions with personal characteristics using seemingly unrelated regressions show systematic differences in allocations. Survey format differences such as reversing the order of budget categories do not matter. High (negative) correlation of the MWTO values with a measure of how well a goal has been achieved indicates reliability of the elicited budget values. So, it appears that the contingent budget choice technique elicits a deliberative and meaningful response.

Respondents were found to have substantial, but imperfect, knowledge of actual budget shares. Respondents tended to allocate their increments more evenly across program areas than the actual budget is allocated, but the correlation between perceived and actual shares was still high, 0.79. When information was provided about the actual state budget, respondents allocated their responses in a more concentrated manner. Actual budget information provision increased allocations to programs with large existing budget shares. Because, when actual budget information is provided, respondents gain an understanding of the resources currently used to provide the current and actual levels of program services, respondents can react in a more realistic manner when faced with allocating a surplus. However, the rankings of programs are similar regardless of budget information provision. This adds credence to our evidence that the technique is a valid one.

By collecting socioeconomic information in the survey and using regression analysis, it is possible for policy makers to gain an understanding of how different constituencies will react to allocating a budget surplus across programs. For example, among the categories in the Kentucky state budget, respondents prefer that an increase in funding be allocated more toward education (18 percent of the increase) and health care (12.1 percent), and these two were the largest of the 13 budget categories. Regression analysis shows that people with more education and income want more of the share devoted to

education, and that women and people without children want more of the share devoted to health care.

These results of our survey suggest further development of the budget choices technique might be promising. This source of information has the public budget decision-making elements of incrementalism, performance assessment, and especially citizen or community values. The allocations elicited in contingent choice budget survey information are based on informed deliberation and realistic choices. The values can reflect budget limits and the current activity or output of the public programs. Public decision makers might well value information about managing public programs from this source as a complement to their existing sources of information, especially when the best option is not obvious.

NOTES

Early drafts of this paper benefited from comments received at the University of Kentucky Public Policy Seminar (Martin School of Public Policy and Administration), Applied Microeconomics Workshop (Department of Economics), and from Magnus Johannesson and two anonymous reviewers. We thank Richard O'Connor, Susan Westneat, and Jim Wolf for help in developing the survey instruments and sampling frames. We acknowledge the University of Kentucky Center for Business and Economic Research for administering the telephone portion of the survey and assisting in the collection of mail survey responses. This research was supported in part under Memorandum of Agreement No. 13814 between the Kentucky Water Resources Research Institute and the Kentucky Natural Resources and Environmental Protection Cabinet. We thank Jack Wilson for his sustained encouragement of this project and Talina Mathews for her administrative help in completing the report. The views expressed in this report are the authors' only.