Cambridge Core

For further information about this journal please go to the journal web site at:
cambridge.org/bca

CAMBRIDGE
UNIVERSITY PRESS

Journal of Benefit-Cost Analysis

VOLUME 11 | ISSUE 1 | SPRING 2020

CAMBRIDGE

Journal of Benefit-Cost Analysis

Society for **Benefit-Cost Analysis**

CAMBRIDGE
UNIVERSITY PRESS

Journal of Benefit-Cost Analysis

Editor's Introduction: The Office of Information and Regulatory Affairs – Past, Present and Future

It is with great pride and delight that we present the following collection of seven papers addressing the role of the Office of Information and Regulatory Affairs (OIRA) historically and in the future. It is an intellectually productive exercise for the beginning of a Presidential election year in the United States where benefits and costs of regulation are a campaign issue.

The intellectual exchange to follow begins with a long paper by James Tozzi, who is well known as a chronicler of the activities of OIRA. We are indeed fortunate to have Jim's paper to be the vehicle to generate discussion of regulatory activities of the federal executive branch of government in the U.S. Additionally exciting is that we have been able to present commentary by six former heads of OIRA on the Tozzi paper and their views of the past, present and future of the agency. The group consists of both Democratic and Republican appointees, including the first Administrator of the agency. In their historical order of service, we have comments by Jim Miller, Chris DeMuth, Sally Katzen, John Graham, Susan Dudley, and Howard Shelanski. We are grateful for the insights of all the seven authors.

Finally, I wish to acknowledge my recently deceased colleague, Michael Uhlmann, who had the idea for this project. Michael was an exceptional intellect, a lawyer with a PhD in political science, who was both an Assistant Attorney General and a Special Assistant to the President. He was there at the beginning of both Council on Wage and Price Stability (CWPS) and OIRA. Michael is the only person I know who has a Razor named after him that relates to regulatory affairs.[1] I only wish he were alive to enjoy the following seven papers as much as the rest of us. Bon Appetit'.

Thomas J. Kniesner
Editor, *Journal of Benefit-Cost Analysis*

---

1 As Casey Stengel once remarked, "You can look it up."

Jim Tozzi*

Office of Information and Regulatory Affairs: Past, Present, and Future

Abstract: This article has three sections, each of which deals with an Executive Order. The first section, "Office of Information and Regulatory Affairs (OIRA) Past," emphasizes the critical role that Executive Orders played in the formation of OIRA. More specifically, OIRA owes its initial existence to the establishment of a centralized regulatory review system, the Quality of Life Review, which initiated Office of Management and Budget (OMB) review of environmental regulations through the issuance of a directive from OMB. Every subsequent President expanded OMBs powers through the issuance of Executive Orders which culminated in the Iconic Executive Order 12291. The section concludes with the recommendation that a select class of Executive Orders, and OMB Directives, be designated as "Iconic" by the National Archivist in consultation with the OIRA, and then given substantial deference by incoming Administrations. The second section, "OIRA Present," describes an Executive Order issued during the Kennedy Administration which remains in effect but was promulgated prior to the establishment of OIRA and therefore recommends that a new Executive Order be issued which gives OIRA specific authority to participate in the conduct of interagency reviews of Executive Orders. The third section, "OIRA Future," describes an Executive Order which implements a regulatory budget (RB) and institutionalizes a mechanism for controlling the size of the administrative state. This final section of the article recommends that the aforementioned Executive Order be reviewed and modified based upon the outcome of a request for public comments, and rules with demonstrated positive net benefits should no longer be accorded an automatic entitlement for issuance as a final rule absent their inclusion in an RB.

*Jim Tozzi is a Charter Member of the Senior Executive Service. He served as a career regulatory official in five Presidential Administrations beginning with the Johnson Administration and ending with the Reagan Administration. He was the Assistant Director of the Office of Management and Budget in charge of the Office of Regulatory and Information Policy, the precursor to the Office of Information and Regulatory Affairs, and subsequently was appointed as the first Deputy Administrator of OIRA in OMB.
Jim Tozzi: Center for Regulatory Effectiveness, 1823 Jefferson Place, NW, Washington, DC 20036, USA, e-mail: tozzi@thecre.com

1 The past

1.1 The significance of a historical perspective

The purpose of this section is to demonstrate that if we understand what it is about the development and implementation of centralized regulatory review that has led to its half-century-and-counting longevity, it will help us assess the merits of various proposals to improve the management of the administrative state. In particular, this section focuses on instituting a program in the National Archives which would classify a select number of Executive Orders, including a select group of Office of Management and Budget (OMB) Directives, as "Iconic." The Iconic designation would require that an incoming Administration give considerable deference to these Executive Orders and OMB Directives prior to considering their revocation.

Scholars have concluded that centralized review of regulations by the White House Office of Information and Regulatory Affairs (OIRA) is the most important institutional feature of the administrative state (Bagley & Revesz, 2006; Center for Regulatory Effectiveness (CRE), Quality of Life Review; http://thecre.com/ombpa pers/quality_of_life.html). Justice Breyer has stated that "OIRA is the lineal descendant of efforts by Presidents Nixon, Ford, and Carter to achieve greater coordination within the huge Executive Branch" (Breyer, 1995).

OIRA and its centralized regulatory review function have been honed over the last half-century (Tozzi, 2017*d*). Centralized review thus provides a record that can and should be studied to identify the attributes that have led to the program's longevity. The longevity of centralized regulatory review results from its being nourished and sustained by the focused work of a group of practitioners over a period of five decades and this longevity should serve as the basis for assessing the merits of proposals to modify its underlying structure.

Notwithstanding its longevity, centralized regulatory review is not an entitlement; if it is abused it can vanish with the stroke of a pen. Its defining components are based upon a series of Executive Orders, not an explicit delegation of authority from the Congress to the President (Pierce, 2019a).

Time Magazine has stated that Executive Order 12291 (Reagan, 1981) is one of nine Executive Orders that has "changed the course of America" (Rothman, 2017).

EO 12291 established the mechanism that became the foundation for centralized regulatory review. Steps should be taken to ensure that forthcoming Executive Orders abide by the standards established in Executive Order 12291. Failure to do so could result in a game-changing intervention by either the Congress or the Courts which would jeopardize centralized regulatory review. It is for this reason that there is a need to review the procedures and standards used for the formulation and implementation of Executive Orders which have implemented the regulatory agendas of a number of Presidential Administrations.

1.2 Defining centralized regulatory review by Executive Orders

Calendar Year 2019 marks the 50th year since Professor A. Allan Schmid, on leave to a position in the Pentagon, declared that benefit-cost analysis should be applied to regulations – a giant intellectual leap from its then current use as a tool to analyze the economic merits of civil works projects such as inland waterways and dams (Tozzi, 2017c). The foundation for centralized regulatory review, that is, White House OMB review of agency regulations, was laid during the Johnson Administration when the Office of the Secretary of the Army began reviewing benefit-cost analyses of Corps of Engineers regulations. Two years subsequent to the publication of Professor Schmid's paper, the OMB initiated the first centralized regulatory review process when it began reviewing environmental, health, and safety rules with an emphasis on Environmental Protection Agency's (EPA) rules. The Nixon Administration's program, which required an analysis of the benefits and costs of a regulation, was named the Quality of Life Review and was the first program which ordered White House oversight of agency regulations (Lubbers, 2018, p. 19).

In each of the ensuing Administrations, the President strengthened the centralized review of regulations by issuing Executive Orders, for example, Ford's (inflation/economic impact statements), Carter's (OMB oversight of the regulatory process), and Reagan's Iconic Executive Order 12291, which mandated for the first time – on a government-wide basis – both the benefit-cost analysis of rules and that the rules be submitted to OMB for review. These landmark actions were then reinforced by supporting Executive Orders which have been signed by every subsequent President. Of particular note, President Clinton's Executive Order 12866 became the successor and prevailing Executive Order for centralized regulatory review (DeMuth, 2011; Katzen, 2011; Miller, 2011). President Obama furthered the cause by issuing Executive Order 13563 which strengthened the bipartisan foundation for centralized regulatory review.

1.3 The significance of an Iconic Executive Order

In this age signified by a near Gatling gun approach to issuing of Executive Orders, practitioners and the academic community are to be complimented for devoting increasing attention to the institutional standing of well-reasoned, peer reviewed Presidential instruments, including both Executive Orders and OMB Directives, that stand the test of time. One such example is Executive Order 12291, which capitalized on advances made by four prior Administrations. EO 12291 established the rules of the game for Presidential involvement in agency rulemaking.

This section focuses on establishing the analytic norm that should form the basis for the Presidential review or issuance of an Executive Order. Although the administrative state has been subjected to many Executive Orders, only a small number have had a lasting effect (Tozzi, 2018d). A crucial reason for Executive Order 12291's enduring power is that it addressed the very vocal and competing demands by members of Congress and a wide array of stakeholders for either more or less regulation (Verkuil, 1980). The now time-tested decision-making process would be administered by the newly created OIRA. Executive Order 12866 should be understood as EO 12291's bipartisan derivative. Executive Order 12291 was in part an outgrowth of the inability of Congress to pass legislation which would control an ever-increasing regulatory burden that contributed to rampant inflation. OMB was more interested in the passage of the Paperwork Reduction Act than it was in legislation that would, in its mind, limit its flexibility in overseeing the administrative state (Behr, 1981).

Consequently, notwithstanding our tendency to ignore history, centralized regulatory review did not begin with Executive Order 12866, although it did fortunately provide centralized review with timely bipartisan support for its continuation. The signing of the Executive Order was a remarkable achievement because, without it, centralized regulatory review would have been terminated as a result of hostile opposition from within the Administration.

Executive Order 12291s landmark achievement was to require that regulatory agencies on a government-wide basis perform benefit/cost analyses of regulations and to submit the regulations and accompanying analyses to OMB for review, as was initially required by the Nixon Quality of Life Review (Shultz, 1971). All regulatory actions taken by subsequent Administrations built upon these two building blocks of benefit-cost analysis and OMB review. Building these two blocks took 20 years and spanned five Presidential Administrations (Kirschten, 1983).

Executive Order 12291 gave legitimacy to, and increased the jurisdiction of, the best (Shultz, 1971) of the various time tested centralized regulatory review processes developed and implemented (Ford, 1974) by the four prior Presidential

Administrations (Carter, 1978) – another step toward bipartisanship in establishing centralized regulatory review.

Executive Order 12866 stands on a formidable foundation. Consequently, its progeny may be the subject of a serious challenge since both Executive Orders are intrinsically linked. Challenges to the administrative powers of the President might occur when the Congress concludes that either an incumbent President, or a continuum of Presidents, abuse such authorities. In such an event, instruments which have been around for half a century might be spared the ax if the responsible authorities are advised of their lineage.

In essence, OIRA has two time-tested institutional anchors which should be exploited when the organization is in jeopardy, Executive Orders 12291 and Executive Order 12886. A potential third anchor under development deals with OIRA as a manifestation of "internal" agency specific law (Tozzi, 2019a).

Below are the views of leading scholars in the field of administrative law on Executive Order 12291:

  (i) "Second, and more innovatively, his [Reagan] Administration issued the Now-Iconic Executive Order 12291" (Mashaw & Berke, 2018).
 (ii) "In a meeting sponsored by the Federalist Society…Professor David Vladek of Georgetown University law school" observed "That the Reagan Executive Order 12291, which instituted government-wide centralized regulatory review is, along with the APA [Administrative Procedure Act], one of the two most influential documents of the regulatory state" (Tozzi, 2017d).
(iii) "Arguably, the most important legal document of the last 30 years that hardly anyone in America knows about was Executive Order No. 12291, the Reagan executive order that created the modern system of White House oversight of federal regulatory policy making" (Shane, 2011).
 (iv) "To date, the cost-benefit revolution has had three defining moments. The first moment, and by far the most important, came from Ronald Reagan in 1981, when he signed Executive Order 12291, with the most boring imaginable title: Federal Regulation" (Sunstein, 2018).

Executive Order 12291 has become an institution because it did not overreach; it never claimed to displace the authority of an agency to make the final call on the substance of a rule. Equally, if not more importantly, the administrative processes used to implement the Order were time tested and refined before they were implemented on a government-wide basis as a result of a decade of experience gained through the Quality of Life Review, initiated in 1971, which focused on the EPA (Tozzi, 2011; Morrison, 1986). A bridge still to be crossed is the application of the Executive Order to independent agencies (Gray, 2017).

The policies and processes inherent in Executive Order 12291 were initially implemented by the first office in OMB dedicated solely to regulatory review and oversight – the Office of Regulatory and Information Policy (Marshall, 1982). This office was a functioning unit that predated OIRA. Upon morphing into OIRA, this office ensured that Executive Order 12291 did not migrate to the Executive Order graveyard. Not only is the sustainability of an Executive Order as dependent upon it is implementation as it is on its design, but also its shelf life is enhanced by bipartisan sponsorship as was the case when President Carter included the passage of the Paperwork Reduction Act, which created OIRA, into his State of the Union address (Carter, 1981).

What is needed is for the National Archives and OIRA to research the factors which lead to the institutionalization of a select number of Executive Orders. An emphasis should be placed on the executive actions that have made a permanent change in governmental operations comparable to those resulting from the promulgation of Executive Order 12291. The National Archives has a record of analyzing regulatory process changes (Tozzi, 2009). Hopefully, the resulting work product would establish a quality norm for future executive actions.

Adherence to accepted norms could provide a filter to be used prior to the issuance of an Executive Order which revokes an existing one as was the case with Executive Order 13497 which stated: "Executive Order 13258 (Bush, 2002) of February 26, 2002, and Executive Order 13422 of January 18, 2007 (Bush, 2007) concerning regulatory planning and review, which amended Executive Order 12866 of September 30, 1993, are revoked."

One might wonder why Executive Order 12291s progeny did not suffer a similar fate given the fact that the two aforementioned Executive Orders were minimal expressions of the base program. A crucial answer is that Executive Order 12291's progeny was bipartisan.

Readers interested in a detailed review of actions that lead to the institutionalization of Executive Order 12291 should read Beyond Structure and Process: The Early Institutionalization of Regulatory Review by political science professor Andrew Rudalevige (Rudalevige, 2017).

Executive Order 12291, its predecessors and its progeny – Executive Order 12866 – have dominated the regulatory state for a half-century and their formulation and implementation should be the basis for judging the continuity of existing Executive Orders as well as the issuance of future ones (Tozzi, 2017c). Executive Order 12291 establishes the quality norm for Executive Orders because it (i) did not contain a jurisdictional overreach, (ii) was accompanied by an extensive legal analysis supporting its content, (iii) was premised on processes which were tested prior to their incorporation into an Executive Order, (iv) was reviewed to determine whether Executive Order 12291 did in itself comply with its directives, particularly that its benefits exceed its costs, and (v) was accompanied by the provision of an adequate staffing level.

The National Archives, the keeper of the nation's most treasured documents and the publisher of the Federal Register, in consultation with OIRA, should be vested with the mandate to review all Executive Orders having regulatory consequences and to classify a select number of them as "Iconic," meaning that incoming Administrations should accord them procedural and substantive deference prior to considering their revocation.

2 The present

2.1 OIRA review of Executive Orders

OIRA owes its existence to a statute, the Paperwork Reduction Act of 1980 (Behr, 1981); it owes its personality to a series of Executive Orders issued by a number of Presidential Administrations. Consequently, there are a number of ways to address "The Present." One common approach is to analyze the regulatory program of the incumbent Administration and make suggestions thereto. Another analytic approach is to identify a void in the regulatory program of the incumbent Administration as well as a deficiency in the program of its predecessors. This step of identifying program deficiencies is of paramount importance because of the changing landscape of the administrative state and therefore it is the approach taken herein.

Section 1 delineates the ascendancy of Executive Orders in the management of the administrative state and provides an analysis of an exemplary Order, and its progeny. Thus, the section provides the historical and analytical bases for using the exemplary Order as the norm against which other Orders should be evaluated. This section provides the rationale for OIRA review of forthcoming Executive Orders as well as the revocation of existing ones. The historical preoccupation with judicial review is changing in that emerging scholarly articles are beginning to address agency edicts: "For years, administrative law has been identified as the external review of agency action, primarily by courts. Following in the footsteps of pioneering administrative law scholars, a growing body of recent scholarship has begun to attend to the role of internal norms and structures in controlling agency action" (Metzger & Stack, 2017). Professor Richard Pierce has made a similar point: "I continue to support the proposal that Justice (then Professor) Breyer made in 1993: we should replace counterproductive judicial review with review by a version of OIRA that is better staffed and broader in the values it brings to the review process" (Pierce, 2017). There is no better venue for the academy, political scientists, and economists to focus their attention on than the need for OIRA to review Executive Orders.

On June 21, 1962, the Kennedy Administration published Executive Order 11030 dealing with preparation and review of Executive Orders (Kennedy, 1962). Although it has been subject to a number of amendments, the Executive Order continues to vest OMB with the authority of managing the review of Executive Orders within the Executive Branch. OIRA participation in this process is *ad hoc* at best. The review process was and usually remains reserved for the OMBs General Counsel and the Department of Justice. Both of these institutions were and are staffed by extremely high-caliber individuals; nonetheless, they lack the day-to-day operating knowledge of OIRA with respect to the intricacies of the administrative state. The Kennedy Executive Order was issued prior to the establishment of OIRA.

It is for this reason that the White House, using Executive Order 11030 as its base, should issue a new Executive Order to amend its administrative process to require that proposed Executive Orders be reviewed by the General Counsel of OMB in consultation with the Administrator of OIRA. Consequently, incoming Administrations would submit proposed revocations of regulatory related Executive Orders of the former Administration to the career specialists in OIRA and the same process would apply to the new Executive Orders issued by the incoming Administration. In each case, the analytical norm would be the underlying legal principles set forth in Executive Order 12291 (Simms, 1981). The resultant OIRA review need not be a public endeavor but, in select instances, could be subject to public comment. The CRE has compiled a compendium of selected works by recognized scholars (CRE, OMB Papers, n.d.). This canon should serve as a guide to OIRA in conducting the aforementioned reviews. In addition the CRE maintains a daily report on a key activity associated with the management of OIRA (CRE, OIRA Watch; http://www.thecre.com/oira/).

2.2 The necessity for OIRA involvement

OIRA which has been referred to as the "cockpit" of the administrative state, has been functioning for nearly four decades and since it is staffed predominantly by career civil servants, it possesses the institutional memory for the happenings in a wide range of programs and agencies. Three recent Presidents, George W. Bush, Barack Obama, and Donald Trump have utilized, to the fullest, the issuance of Executive Orders to implement their programs. There is a significant likelihood that the use of Executive Orders will continue to increase, probably at a rate considerably greater than most observers realize (Dodds, 2008; Appelbaum & Shear, 2016; Tozzi, 2018*b*).

Presidential use of Executive Orders can be traced to the early views of Alexander Hamilton in the Federalist Papers, which matured into their zenith during the Franklin D. Roosevelt Administration (White, 2018, p. 1572). The historical significance of Executive Orders in the governance of the regulatory state has been followed in large part by historians and political scientists and, to a lesser degree, by members of the legal community whose education focuses on the management of the administrative state through rulemaking and judicial review (Tozzi, 2018*c*). Nonetheless, the increasing reliance by Presidents on Executive Orders has not escaped the critical eye of some legal scholars of the administrative state (White, 2018).

The significance in addressing the issuance of Executive Orders can only continue to increase with the expected increase in litigation surrounding the ascendancy of the "muscular" presidency which is characterized by the pivotal management of the administrative state by components of the Executive Office of the President. The following administrative authorities and studies are of particular significance to OIRA:

 (i) President's Committee on Administrative Management: Report (The President's Committee on Administrative Management, 1937);
 (ii) President's Committee on Administrative Management: Analysis (Newbold & Terry, 2006);
(iii) Procedure in Administrative Rule-Making (Fuchs, 1938);
(iv) Effective Public Policy and the Government Budget: A Uniform Treatment of Public Expenditures and Public Rules (Schmid, 1969);
 (v) Executive Order 12291 (Reagan, 1981).

The Presidency is, for good reason, not subject to the Administrative Procedure Act, but in the ascendancy of the "muscular" presidency, ill-founded Executive Orders could undermine 50 years of centralized regulatory review. This could occur as the result of a continuum of negative judicial decisions or Congressional mandates (Rasso, 2018). For these reasons, OIRA should be involved in both the issuance of new Executive Orders as well as the revocation of existing Executive Orders using the Iconic Executive Order 12291, and its offspring Executive Order 12886, as templates for its actions.

As noted at the beginning of this article, centralized regulatory review is not an entitlement; it was established by selfless individuals working for nearly two decades; it could vanish, in large part, with the stroke of a pen. Nonetheless, OIRA does have a statutory base and has been delegated unexplored authorities in the Paperwork Reduction Act of 1995 and the Data Quality Act (DQA) also known as the Information Quality Act (Tozzi, 2018*a*).

For all of the reasons set forth above, OIRA should become the institutional memory on Executive Orders with regulatory consequences by participating in both the issuance of new Orders as well as the revocation of existing Orders through the issuance of an Executive Order which vests it with such a responsibility.

3 The future

3.1 The need to place an incremental ceiling on public expenditures for compliance with federal regulations

In November 2018, the American Bar Association (ABA) Section on Administrative Law held its annual regulatory summit (Emery & Prosnitz, 2018). The attendance was record breaking as were the quality of the presentations and timeliness of the topics. The agenda addressed the pacesetting issues of today. The discussants were well prepared and included those of differing views. A common refrain echoed throughout the summit was that the agenda was so enticing that it was impossible for a particular attendee to attend two panels at the same time.

The impact of an ABA Administrative Law Section conference does not end with the final presentation at the conference; instead it is the incubator for ongoing discussions of concerns critical to the proper functioning of the administrative state.

However, the totality of the presentations at the conference leads to the conclusion that, notwithstanding the many worthwhile proposals to improve the regulatory process, in the absence of a macro constraint on incremental regulatory expenditures, the regulators in attendance will continue to have the unilateral ability to impose an unlimited *de facto* tax on every living American – irrespective of whether the aforementioned proposals are implemented.

Accordingly, a public debate should ensue as to whether such a capability should continue unabated if and when the existing regulatory budget (RB) is revisited. Such a debate is relevant because even if only those regulations whose benefits exceed their costs are promulgated, the majority of the benefits may not accrue to those paying the costs. Therefore, the nation is confronted with a potential shortage – at an exceedingly high opportunity cost – of capital to finance the totality of regulations whose benefits exceed their costs.

Whether or not to institute a ceiling on these *de facto* taxes is a public policy issue that needs to be addressed when, and preferably before, the existing constraint on regulatory expenditures expires. In a nutshell, there is presently a constraint on the incremental costs that regulators can impose on the public as a result of the

implementation of an RB. Should this constraint or a variant thereto continue for the foreseeable future? Even if the answer is yes, the particular mechanism to do so is also open for debate.

Regulatory practitioners and members of academia have a wide range of significant issues before them and it is likely that the aforementioned issue will not rank highly with the general public in part because of the ever increasing role of regulators and non-government organizations in opposing measures to restrict the size of the administrative state during the legislative process (Walker, 2017; Tozzi, 2018*a*). That said, the implementation of a program to control the cost of regulation could be the starting point for OIRA to develop a national constituency.

If a member of the public wishes to increase funding for school lunches he or she must convince the Department of Agriculture's Food and Nutrition Service to accord a higher priority to school lunches at the expense of other programs in competition for the same funds, including but definitely not limited to:

(i) Commodity Supplemental Food Program (United States Department of Agriculture, Food and Nutrition Service, Commodity Supplemental Food Program; https://www.fns.usda.gov/csfp/commodity-supplemental-food-program-csfp). The CSFP works to improve the health of low-income elderly persons of at least 60 years of age by supplementing their diets with nutritious United States Department of Agriculture (USDA) Foods.

(ii) Food Distribution Program on Indian Reservations (USDA, FDPIR). The FDPIR is a Federal program that provides USDA Foods to low-income households, including the elderly, those living on Indian reservations, and to Native American families residing in designated areas near reservations.

(iii) School Breakfast Program (USDA, SBP; https://www.fns.usda.gov/sbp/school-breakfast-program-sbp). The SBP operates in the same manner as the National School Lunch Program. School districts and independent schools that choose to take part in the breakfast program receive cash subsidies from the USDA for each meal they serve.

In this example, the group which receives the benefit from the increased funding (program participants) differs markedly from those paying the bill (the general tax payer); the former have virtually no limit on the amount of benefits they are willing to receive but those paying the bill definitely have a finite pool of resources to finance the regulation. Therefore, the fact that the benefits of the program exceed its costs has little relevance in itself because there are constraints on the magnitude of funds available to finance the program. In on-budget decision-making the public is made aware of the consequences of funding one beneficiary group at the expense of another.

Now what makes the existence and consequences of a financial constraint vanish when a regulator issues a rule for which the benefit exceeds its costs? The answer is that they do not; instead they are hidden from public scrutiny.

On the other hand when a member of the public wants to increase the nutritional value of school lunches he or she only has to convince USDA regulators to revise its existing regulation which regulates the nutritional content of food served in the school lunch program and demonstrate that the benefits of the proposal to whomsoever they accrue exceed its costs. In this instance, regulators are levying a unilateral *de facto* tax on the general public to finance benefits for a specific class of program beneficiaries. Why should not the magnitude of the tax be a decision of elected officials on a government-wide basis in a transparent manner in lieu of being made on a case by case basis by unelected officials in an opaque manner? The adoption of an RB addresses these matters and inserts a ceiling on *de facto* tax increases. There might be some truth in the adage that "there is no free lunch."

In addition, if there were ever an instrument capable of fulfilling OIRAs responsibility of harmonizing regulatory programs across all federal agencies, the RB is such a mechanism (Bagley & Revesz, 2006). The execution of an RB requires the simultaneous examination of the net benefits of all regulations promulgated by all agencies thus allowing for the development of a macro strategy that maximizes net benefits across all agencies. Therefore, we need another Iconic Executive Order, similar to Executive Order 12291, which would be based on public comments received on Executive Order 13771 and would delineate the legal foundation and process to be used to implement the Order.

3.2 RB: An administrative solution

The Trump RB is resulting in an unprecedented reduction in compliance costs based on reports issued by established third parties (Bosch, 2018). Although the long-term implications of certain provisions of the RB are to be determined, such as "One-in, Two-out," the RB is working as was designed, agencies are given totals to work within to achieve government-wide objectives. Year to date reductions in compliance costs are a substantial achievement in such a short period of time.

Ideally, the magnitude of the ceiling placed on the costs to be imposed by regulators should be a decision of the Congress. Subsequent to such an action by the Congress, any such ceiling will have to be implemented by the Executive Branch consistent with prevailing statutes.

From the onset a wide range of questions emerge. What is the level of the ceiling and how is it determined? How to implement such a ceiling so that it does not violate

any existing statutes? How are benefits of regulations incorporated into the functioning of an RB? These are all legitimate questions and the point being made is that practitioners and academicians should devote resources to answering these questions in lieu of challenging the concept of a ceiling. The current debate is reminiscent of the one that occurred some 50 years ago when an academician first recommended that regulations be subjected to a benefit-cost analysis and some opponents of the proposal argued that the requirement would lead to substantial delays in the regulatory process (Nielson, 2017). Benefit-cost analysis has increased in stature over the past half-century; however with the advent of the implementation of an RB, benefit-cost analysis will continue to have an important role but will no longer dominate the process as explained herein (Graham & Liu, 2014; Pierce, 2019b; Tozzi, 2019b, Appelbaum, 2019).

President Carter was the first President to make a favorable statement on an RB in his Economic Report of the President and he was the first President to develop a prototype RB of a specific agency (Tozzi, 1979).

The Carter Administration recognized the importance of having a uniform set of cost data across all agencies and made a substantial investment in developing the proposed Regulatory Cost Accounting Act of 1980 (RCAA, 1980).

President Trump is the first President to actually implement an RB on a government-wide basis. The concept of an RB has been supported by academicians and practitioners including Christopher C. DeMuth, Clyde Wayne Crews, Jr, C. Jarrett Dieterle, Susan E. Dudley, Jeff Rosen, and other authors during the same time period (DeMuth, 1980; Crews, 1996; Dudley, 2016; Rosen, 2016b; Dieterle, 2017; CRE, CCCR, n.d.). Why where these articles not followed by a program to implement an RB?

Several legislative actions were proposed and these are addressed in the following section. However, no significant action was taken administratively until the Trump Administration issued an Executive Order mandating the government-wide adoption of an RB. The Trump RB included a "One-in, Two-out" provision, which was not contained in the RB proposed by the Carter Administration. Almost exactly one year prior to the inauguration of the Trump Administration, a regulatory practitioner predicted that, in the near future, an Administration would implement and institutionalize an RB (Tozzi, 2016). In support of its prediction, the article provided a review of the distinguished organizations and individuals who were lining up to support an RBs implementation and other notable events such as:

(i) The Administrative Law Review's publication of the article *The Regulatory Budget Revisited* (Rosen & Callanan, 2014).
(ii) The release of a white paper by the research chief of the Administrative Conference of the USA, Controlling the Cumulative Costs of Regulation,

that reviews various proposed solutions to runaway regulatory costs, including a One-in-One-out regulatory budget (Bull, 2015).

(iii) Hearings on the issue convened by the Senate Homeland Security and Government Affairs Committee jointly with the Senate Budget and Homeland Security and Government Affairs Committees (United States Senate Homeland, 2015; United States Senate Joint, 2015).

(iv) The endorsement of the idea of regulatory budgeting by at least two Presidential candidates (Goad, 2014; McLaughlin, 2015).

(v) Discussion of regulatory budgeting on the program at the American Bar Association's Administrative Law Section (Rosen, 2015; Rosen, 2016*a*).

(vi) Recognition in a recent Council on Foreign Relations publication that regulatory "budgets do force bureaucracies to weigh regulatory decisions more carefully and systematically analyze the existing regulatory stock" (Council on Foreign Relations, 2015, p. 9).

(vii) CRE dedicates a section of its website to exclusive coverage of a regulatory budget (Tozzi, 2017*e*).

(viii) The adoption of an RB in Canada, the UK, and Australia (Jones, 2015).

There is a large library of research on regulatory budgeting performed over at least four decades in a number of countries which is available for examination (Tozzi, 2015). The breadth and depth of the articles display an international interest in the concept of an RB. The articles are written by both academicians and practitioners and frequently focus on the results of implementing an RB in different countries.

A matter of particular interest is the "One-in; Two-out" provision contained in the Trump RB. In-depth studies have been performed on this provision. For example, a UK government study explained:

(i) "Our world-leading One-in, One-out rule, introduced in January 2011, and increased to One-in, Two-out in January 2013, has ensured that new regulations are only introduced if absolutely necessary. These rules kick-started a cultural change across Government and regulation is now viewed as a last resort, rather than the default" (United Kingdom, Department for Business Innovation & Skills [UK BIS], 2014, Ministerial Forward).

• "Under One-in, One-out, Departments were encouraged to look for alternatives to regulation wherever possible, and required to find deregulation to match the cost of any new regulation deemed necessary" (UK BIS, 2014, p. 13).

• "Based on the success of One-in, One-out, in January 2013 the Government doubled its ambition by moving to One-in, Two-out. That meant that for every

pound of cost which new domestic regulation imposes on business, two pounds of cost must be removed through deregulation" (UK BIS, 2014, p. 13).

- "The Regulatory Policy Committee's (RPC) scrutiny of Impact Assessments (see below) checks whether Departments have considered alternatives, alongside regulation" (UK BIS, 2014, p. 13).

Many of the procedural concerns that often dominate the regulatory review conversation in the USA, such as the consideration of benefits, did not rank highly in the UK.

The UK's One-in, Two-out strategy (which reportedly is now One-in, Three-out) provided tangible results as verified by their RPC, which reported that at "the close of One-in, One-out on December 31, 2012, the target of offsetting any new cost of regulation by introducing deregulatory measures had been exceeded, with a £1.2 billion net reduction in costs to business" (UK BIS, 2014, p. 13).

To gain a deeper insight into the regulations that were promulgated as well as those that are jettisoned in the One-in, One-out program, the following examples of "in" and "out" regulations are provided. "In" regulations included:

(i) "Gaming Machines (£17m IN). This regulation addresses problem gambling by requiring customers using higher stakes gaming machines to interact directly with staff after the first £50 if they want to continue to play the machine. The aim is to put an end to unsupervised high-stakes machine gaming, ensuring better interaction between customer and operator and improving opportunities for more effective provision of information and interventions" (UK BIS, 2014, p. 10).

(ii) "Charges controls in qualifying schemes used for automatic enrolment (£18.8m IN). This measure is being introduced to ensure that members' retirement savings are not eroded by high or unfair charges. It also supports the Automatic Enrolment Program and will help maintain trust and confidence in pension providers supporting it. The measure will be implemented to allow some combination charging structures which help new providers enter the market, to ensure that there is a diverse competitive market for workplace pensions" (UK BIS, 2014, p. 10).

"Out" regulations included:

(i) "Return of Insurance Certificates (£28.7m OUT). This will remove the requirement for policy holders to return their motor insurance certificate if a policy is cancelled mid-term. This should save businesses £29m" (UK BIS, 2014, p. 9).

(ii) "Construction and Design Management (£19.6m OUT). This measure will ensure there is clearer expression of duties for small projects, as well as a reduction in bureaucracy and appropriate guidance for small projects" (UK BIS, 2014, p. 9).

The One-in, One-out program did not explicitly consider the benefits of the regulations being promulgated and revoked nor did it express any concern over the non-consideration of regulatory benefits. Instead, implicit in the program is the political leadership's trust that the centralized review agency's career civil servants would only implement those actions which maximize public welfare subject to the prevailing constraints.

Another notable feature of regulatory budgeting is that its economic foundations share important historical precedents that are common to the fiscal budgeting. For example, the 1979 Carter Regulatory Budget stated:

(i) "Regulators are more sensitive to direct government expenditures where they face accountability in the appropriations process than they are to the compliance costs faced by the private sector for which they are not accountable. Just as free disposal encouraged excess emissions into the atmosphere, the absence of an RB could encourage excess unaccountable costs and excess regulation. Should not government be accountable for all of the costs it imposes?"

(ii) "As the Annual Report of the Council of Economic Advisers stated: "...there is no institutional framework within the Federal Government – analogous to the budget for Federal spending programs – in which the total costs of regulations are brought together to permit the evaluation of economic impacts, setting of priorities, and the like.' Others have made similar arguments."

(iii) "The RB is another proposal that would represent a fundamental change in our approach to regulation. It is a mechanism that would limit the costs of those actions that federal regulatory agencies could force the private sector and other levels of government to undertake in any given period. If we refer to these latter costs as compliance costs, we can say that the RB would serve to limit regulatory agencies in the compliance costs they can impose on society during some time period in much the same way that the federal expenditure budget limits the departments of the federal government in their expenditures in any given year" (Tozzi, 1979).

Benefit-cost analysis can trace its lineage first to Jules Dupuit and subsequently to Alfred Marshall. However, the economist that brought it to the mainstream was Otto Eckstein when he authored the classic text Water-Resource Development: The

Economics of Project Evaluation (Eckstein, 1958). The text was instrumental in the emergence of the Army Corps of Engineers as the go-to agency in conducting benefit-cost analysis. The work of the Corps of Engineers on benefit-cost analysis was also instrumental in the establishment of centralized regulatory review (Tozzi, 2017c). During this critical period Professor Eckstein served as a member of President Johnson's Council of Economic Advisers.

With the advent of an RB, the USA is moving toward a place where the tools and methodologies of benefit-cost analysis and welfare economics no longer dominate. Instead, the field of institutional economics provides the conceptual paradigm. Institutional economists study how institutions shape economic behavior. Allan Schmid, for instance, was an institutional economist.

The concept of an RB was promoted by the Carter Administration some 40 years ago (Doern, 2009, p. 4). In the intervening years the RB has been reviewed by a number of experts but it has not, until recently, benefited from some of the recent advances in institutional economics.

Benefit-cost analysis has its footing in welfare economics. Welfare economics is the branch of economics which utilizes the techniques common to neoclassical economics to assess the impact of a project on the welfare of all citizens. In order to do so one needs to develop a social welfare function which can be used to rank projects. Economics involves the allocation of scarce resources among competing ends. An allocation is Pareto optimal if and only if it maximizes a particular social welfare function in which the project harms no one but improves the well-being (welfare) of at least one individual. The aforementioned Pareto optimality is difficult to achieve therefore an alternative is the Kaldor-Hicks criterion which is fulfilled when the beneficiaries of a project are in the position to compensate those who suffer a loss from the project. Economists have debated the merits of the aforementioned criteria for years. That said, most of the practitioners of benefit-cost analysis support its continued use in ranking projects.

A significant number of individuals continue to work on improving benefit-cost analysis and it is beyond the scope of this article to address potential areas of inquiry (Hopkins & Stanley, 2015). However, since it is unlikely that a Pareto improvement will occur in the immediate future, nor will a Kaldor-Hicks improvement necessarily increase public welfare, the mandatory adoption of all rules whose benefits exceed their costs is not sound public policy. Consequently, benefit-cost analysis as presently practiced needs to be augmented by other measures; a cornucopia of such measures is housed in the field of institutional economics.

In the early years of the 20th century and in a departure from the then prevailing neoclassical economics, a number of economists were of the view that: "The proper subject-matter of economic theory is institutions. Economic theory is concerned with matters of process… Economic theory must be based upon an acceptable theory of

human behavior" (Hamilton, 1919, pp. 313, 316). Today, that statement might be associated more with a member of the legal profession than the economic profession; the standing of the economic profession, however, is always in a state of flux (Kwak, 2019). The emphasis on institutionalism then began to fade in the 1940s with a renewed emphasis on neoclassical economics which emphasizes the role of the individual, the principle of market equilibrium and rational decision-making as taught in standard economic textbooks.

Nonetheless with the advent of the twenty-first century institutional economics has regained its status as a functioning discipline in the economics profession. There was a reawakening of scholars who supported the earlier statements of W.H. Hamilton who stated that neoclassical economics "neglected the influence exercised over conduct by the scheme of institutions under which one lives and must seek his good" (Hamilton, 1919, p. 318).

It was 100 years ago when Hamilton made the aforementioned statement; it was 50 years ago that it was reinforced by this statement, made by the author of the following article: "The central theme of the paper is that value judgments are implicit in the criteria used for the measurement of the benefits and costs associated with a proposed investment and that conventional benefit-cost ratios tend to conceal these opinions" (Tozzi, 1969). Nearly 100 years after Hamilton's statement was published, other authors made a similar realization: "This Note examines the neoclassical economic framework that pervades contemporary benefit-cost analysis and considers how the fields of behavioral economics and hedonic adaptation may offer superior tools for assessing how regulations impact human behavior" (Vitarelli, 2010).

The purpose of this discussion is not to revamp procedures for benefit-cost analysis, but to emphasize that as we move to a new plateau in the governance of the regulatory state that we must give greater consideration to the views and tools of the institutional economist.

Institutional economists define an institution as the rules of the game, the humanly devised constraints that structure human interaction. As we move to a new plateau in analyzing an RB, we must delve into two tools that thus far have not been introduced into the debate on a continuous basis: (i) Optimal Delegation Theory and (ii) Game Theory. With respect to Game Theory, the concept of an institution is essential to assessing its effectiveness. Game Theory is a branch of mathematics which analyzes the interactive relationships in competitive situations where the standing of any one participant is determined by the action of other participants. Many game theorists define the term "institution" as the behavioral patterns that are of importance to the theorist and therefore not necessarily needing a per se affiliation with an "organization." Given this broad definition of the term "institution," the allowable set of procedures and assumptions common to its execution are substantial and govern their usefulness to the practitioner.

Neoclassical economics and traditional institutional economics lack the ability to analyze the complex interdependencies among individuals which are not driven by the profit motive, do not have complete information and are subject herd-like investing. Econometricians have had considerable success in refining the models and simulations used to understand these interdependencies and therefore have been expanding on the understanding of the concepts defined by neoclassical and institutional economists. That said, in the view of this practitioner, the gulf between the findings of the academicians and the implementation of such game-theoretic findings by the practitioner community is substantial if not increasing.

With respect to Game Theory, an RB might be viewed as the rules applicable to principals and their associated agents and the resultant games might range from a zero sum game to a differential game (Tozzi, 1966; Tozzi, 2017a). A rigorous game-theoretic analysis of an RB would be very beneficial. Although there are game-theoretic analyses which include optimal delegation considerations, a paper on the application of Game Theory to the working of an RB appears to be non-existent and therefore is beyond the scope of this article.

This is not to say that there has been no work in this area; to the contrary foundational work has been devoted to modeling notice-and-comment rulemaking as a sequential game (Johnston, 2002). The author states that the game begins with (i) the "agency's decision whether to propose a rule, proceeds through (ii) a lobbying stage in which both the agency and regulatory targets lobby the executive and legislative branches, and ends with (iii) a decision by the regulatory target on whether or not to seek judicial review of the regulation. In this game, regulatory targets possess private information as to the cost of compliance and have two opportunities to block regulation. Their first chance is provided by a lobbying contest that is initiated by (and sometimes even before) a regulation is proposed. Here, they attempt to increase the political costs to the agency from going forward with the regulation as proposed. If they fail to kill the regulation, then targets have an opportunity to seek judicial review of the regulation. Although simplified, this sequential game captures many of the key strategic features of the regulation game, and generates a number of nonintuitive insights into agency rulemaking incentives under alternative institutional environments" (Johnston, 2002).

It is for this reason that the attention herein will be devoted to advances made by the econometric community outside the realm of Game Theory.

Optimal Delegation Theory has been the topic of numerous articles written by econometricians over a number of years. However, until just recently, the application of Optimal Delegation Theory to the execution of an RB has been minimal. In that econometricians are well known for writing for themselves it is difficult to translate their findings into useable rules for governance of any kind, in particular regulatory governance.

What is optimal delegation theory and why is it important to the functioning of an RB?

First, what is an RB? An RB is a ceiling on the total incremental cost of complying with regulations that can be imposed on the regulated community by a regulator.

After 40 years of discussion and analysis, an RB has been implemented by an Executive Order of the President. The issuance of the Executive Order has been very controversial and it is only a matter of time before the entire issue will be revisited. As of this date, a review of the merits of implementing an RB have been tailored around the possible use of benefit-cost analysis to rank order potential regulations to be included in an RB as well as the "One-in, Two-out" provision which is an add-on to the traditional RB.

While these reviews and debates are taking place, they are doing so without any input from economists versed in the theory of optimal delegation. Optimal Delegation Theory addresses in a very direct manner the central issue dealing with the execution of an RB, namely a principal, the President, delegates authority to an agency, an agent who might not share the same priorities as does the President, to act in his or her behalf to formulate an RB subject to a financial cap established by the President. Optimal Delegation Theory provides a metric for assessing the impact of a range of attributes in the formulation of an RB such as the biases of the agent.

Fortunately, there is a vast literature assembled over more than four decades on Optimal Delegation Theory written by very informed experts on the matter; unfortunately the vast literature has not been introduced in any substantive degree into the debate on an RB. Furthermore, it will be very difficult to do so for a number of reasons including the fact that those involved in the debate often do not have the mathematical background to master the content of the literature and because the authors of the papers write for their respective communities not policymakers.

Nonetheless, every attempt is being made to address this information gap and it is the responsibility of the econometric-institutional community to provide the relevant background to practitioners in the policy, regulatory, and legal communities.

What is needed is for someone to wade through the mathematics and translate their findings into an easily understood document. In doing so it should be noted that economic models of reality are full of assumptions and these assumptions must be made explicit in reviewing the outcome of a model. Fortunately, we have identified a paper which applies Optimal Delegation Theory to regulatory budgeting and contains a translation of the findings into operating rules.

Prior to discussing the findings of the paper we would like to present some background information on Optimal Delegation Theory which emerges from a PhD

thesis written by B. Holmstrom in 1977 and which as stated above presents a rigorous methodology for the development of procedures for addressing the principal-agent dilemma which is the personification of an RB.

The principal-agent dilemma, the heart of Optimal Delegation Theory, occurs when a person, the principal, authorizes another person, the agent, to act on their behalf. The dilemma arises if an agent acts on his or her own behalf and not necessarily in the best interests of the principal. If the principal and agent are housed in an institution they are governed by rules, however formal or informal and therefore subject to the principals of Optimal Delegation Theory.

Optimal Delegation Theory can trace its roots back to the principal-agent dilemma identified by Adam Smith in 1776 when he concluded: "The directors of such [joint-stock] companies, however, being the managers rather of other people's money than of their own, it cannot well be expected, that they should watch over it with the same anxious vigilance with which the partners in a private copartnery frequently watch over their own. Like the stewards of a rich man, they are apt to consider attention to small matters as not for their master's honor, and very easily give themselves a dispensation from having it. Negligence and profusion, therefore, must always prevail, more or less, in the management of the affairs of such a company" (Smith, 1852).

In this instance, the principle-agent dilemma arises when the shareholders, the principals, authorize others who may not share their interests and will not act on their behalf. The implementation of an RB forces one to address the principal-agent dilemma because the regulatory programs of a President, the principal, are often undertaken by vast bureaucracies who at times do not share the same priorities as that of the President. As one author has stated:

"In the history of economic thought, the principal-agent dilemma is a recent innovation having emerged in the early 1970s. It has matured through time and has lead to a range of new developments in related fields of endeavor; consider that:

Incentive theory is the most important development in economics in the last forty years. The principal-agent model is the core of this theory" (Laffon, 2003).

Now some 40 years subsequent to the recognition of the principle-agent dilemma, as seen through the lens of Optimal Delegation Theory, it has a forceful presence in the initiation of a mechanism to control the size of the administrative state.

Substantive research dealing with the principal agent dilemma was initially produced by the economic community. That said the political science community has an extensive program dedicated to exploiting the output of a rigorous mathematically based analysis of the interrelationship of a principal and its agents as applied to a well-defined Congressional oversight setting.

"Although neither of these empirical forays could be regarded as the final word on the subject, Weingast's articles constitute an enormous contribution to the study

of congressional oversight and public bureaucracy by exemplifying quantitative research directed at precise questions (e.g., what are the political and other determinants of bureaucratic outputs derived from rigorous theory? Almost singlehandedly, these articles raised the bar for academic research in the area of bureaucracy" (Weingast (1984). Weingast offers the "congressional dominance" hypothesis: "The mechanisms evolved by Congress over the past one hundred years comprise an ingenious system for control of agencies that involves little direct congressional monitoring of decisions but which nonetheless results in policies desired by Congress" (Weingast, 1984; Miller, 2005).

The point being made here is that practitioners and policymakers should assess the rich history of the principal-agent dilemma developed by both the economic and political science communities when assessing the merits and making improvements in the RB. Hopefully this will also serve as an incentive for the economic and political science communities to become actively involved in the development of an RB.

In terms of an RB, the particular rules that govern the institution under review can be very wide in scope. In this instance the issue amounts to a delegation problem. What are the rules that govern the delegation of decisions made by the principal to the agent? One definition of optimality is whether the preferences of the principal are maximized. Given this macro view of optimal delegation there are a wide number of variants therein. For example, are the agents biased? Do the agents possess considerably more information than the principal? Do the agents have considerably more expertise than does the principal? And does the principal make only select delegations?

Applying Optimal Delegation Theory to an RB, one would designate the President as the principal and executive branch regulatory agencies as the agents. Professor Yair Listokin has applied Optimal Delegation Theory to the execution of an RB. Whether the President should bind the EPA (or another regulatory agency) to an RB, or should the President allow the EPA to enact any regulations that meet a specified standard or rule, such as positive net benefits, is an example of the type of issue Professor Listokin addresses (Listokin, 2014).

Professor Listokin provides a very in-depth review of an RB based upon the principles of Optimal Delegation Theory. Some of his more significant conclusions are:

(i) "This Essay examines two alternative designs for hierarchical institutions: 'bounded' and 'unbounded.' In a bounded structure, a principal decides on a bounded aggregate numerical allocation, and then an agent makes the allocation to an underlying subject population while complying with the bound. In an unbounded structure, the principal provides no aggregate numerical cap,

but instead provides some other form of guidance to the agent regarding allocation…" (Listokin, 2014, abstract).

(ii) "…This scholarship debates the efficacy of different mechanisms, such as cost-benefit analysis, judicial oversight, executive branch oversight, and public oversight (for example, the Freedom of Information Act), for reducing costs of errors. Each method brings pluses and minuses, but all of the methods leave agencies unbounded. No matter how strict the oversight, any proposed rule that survives the oversight process becomes a regulation. So long as the cost-benefit analysis proves that the regulation has positive net benefits, or the regulation follows the statute, or the regulation passes through appropriate executive or judicial oversight, the regulation may be issued. Because there is no hard ceiling or floor on regulations, agency regulations are promulgated in an unbounded institutional environment" (Listokin, 2014, p. 366).

(iii) "A regulatory budget provides the bounded institutional counterpart to the conventional unbounded regulatory environment. Although the concept of a regulatory budget is more than thirty years old, regulatory budgets are rarely implemented" (Listokin, 2014, p. 367).

(iv) "The analysis in the previous two Parts offers several reasons to believe that bounded institutional structures such as regulatory budgeting may prove superior to traditional unbounded oversight methods" (Listokin, 2014, p. 367).

(v) "Instead of an all-or-nothing approach to regulatory budgeting, wherein a regulatory budget is either applied to all agencies or none, the analysis provided here suggests that a regulatory budget may be appropriate for some agencies but not others. Alternatively, it may be appropriate for the head of an agency to impose a regulatory budget on a sub-agency but inappropriate for Congress to impose one on an entire agency" (Listokin, 2014, p. 368).

Professor Listokin's analysis also provides insights into the limitations of bounded institutions. That said, the paper provides academic support for the idea that regulatory budgeting can be a sound and effective tool for the governance of the administrative state as reinforced by other scholars (Kundu & Nilssen, 2018).

3.3 RB: A legislative solution

If an RB is going to be enshrined in the administrative state then such an event will only occur as a result of the passage of legislation. Nonetheless, in the current environment, it not likely that such circumstances will prevail. Consequently, it is imperative that actions be taken to continue the bipartisan support for centralized

regulatory review. Seeking and obtaining such support is not beyond reach because RBs have been put into place by a number of other countries for years (Doern, 2009; Speer, 2016). Even more significant is the fact that the economic community has developed a comprehensive body of thought in support of Optimal Delegation Theory over four decades as delineated in this article which provides a strong institutional anchor for the implementation of an RB.

A dominant role for Congress in the regulatory budgeting is not only based upon sound public policy arguments but also has the added advantage of providing a degree of protection from legal challenges.

Consequently, subjecting the current Executive Order 13771 to notice and comment will provide a mechanism needed to garner public support for a regulatory budget similar to that enjoyed through the legislative process.

Legislation has been introduced in both the House and the Senate over a period of nearly 40 years and none of it has made any significant advances toward enactment. There are a number of reasons for this inaction by the Congress, including that there is no natural constituency for an RB. The following are some notable examples of regulatory budgeting legislation that has been introduced, although an analysis of specific legislative proposals is beyond the scope of this article.

(i) H.R. 2623 – Lessening Regulatory Costs and Establishing a Federal Regulatory Budget Act of 2017 (Meadows, 2017);
(ii) S. 2982 – Article I Regulatory Budget Act of 2016 (Lee, 2016);
(iii) S. 2988 – Regulatory Cost Assessment Act of 2014 (Lee, 2014);
(iv) S. 51 – A bill to amend the Congressional Budget Act of 1974 to require the Congress to establish, for each fiscal year, a regulatory budget for each Federal agency which sets the maximum costs of compliance with all rules and regulations promulgated by that agency, and for other purposes (Bentsen, 1979).

Many of the key legal issues surrounding the Carter Administration's 1979 RB were discussed two years later, by the same authors, in a landmark law article (Wood et al., 1981). The article was coauthored by an attorney in the Office of the General Counsel of the Corps of Engineers, an office that had extraordinary influence on OMBs regulatory perspective. OMB was very mindful of the legal issues and concerns that were inherent in implementing an RB. Since the OMB officials responsible for regulatory review were transplants from the Civil Works program of the Army Corp of Engineers, it was only natural for them to seek advice and counsel from the Corps' Office of the General Counsel. The article thus speaks from a knowledgeable perspective.

The article strongly suggests that the approach taken by the Carter Administration to implementing an RB was considerably more manageable than an approach

which includes a "One-in; Two-out" provision. This is not to say that the latter is not a meritorious route, but it does indicate that the Carter Administration's approach to limiting the growth of new regulations is quite viable.

3.4 Cumulative cost control: OIRAs' future

From its onset, it was believed that central regulatory review would have three components:

  (i) application of benefit-cost analyses to regulations;
 (ii) establishment of a centralized review authority to check the accuracy of the benefit-cost analysis;
(iii) implementation of a program to control the cumulative cost of regulations.

   Midway through the agenda, a fourth item was added. It became apparent that OIRA would not have the resources it would need to effectively police the issuance of every regulation as well as to conduct retrospective reviews. What was needed was for the DQA to fill this void. The DQA did so by placing the responsibility for initiating a retrospective review on stakeholders through the Act's Request for Correction process. The DQA was an outgrowth of lessons learned about the limited opportunity that stakeholders have for relief from inaccurate information disseminated by federal agencies in the form of standalone reports (Bergeson & Campbell, 2001).
   Section 1 of this article addressed the first two components outlined above and the third was discussed earlier in this section. What remains to be discussed, however, is the institutionalization of regulatory budgeting. Institutionalizing regulatory budgeting – ensuring that it becomes a lasting practice – requires that OIRA lay the foundation for its assuming a long-term role in centralized regulatory review.
   It is impossible for OIRA to control the administrative state solely by reviewing individual regulations for the following reasons: (i) OIRA is now reviewing around 10% of the regulations promulgated by federal agencies and (ii) cumulative costs are not considered in the reviews of individual regulations.
   The originators of centralized regulatory review thought it would take five years to institutionalize the process. Instead, the struggle for centralized review took nearly 20 years and came to fruition with the passage of the Paperwork Reduction Act of 1980, which established OIRA (Kirschten, 1983; Granquist & Tozzi, 1980).
   The obvious question is why did it take 40 years after OIRA was established and after detailed RB proposals were developed in both the executive and legislative branches before an RB was implemented through an Executive Order? It should be noted that there was an institutional infrastructure, already in place, for cumulative

cost control during this period as well as blueprints for its implementation and support from a number of practitioners.

There are a number of reasons for the delay. The primary reason is that, from the onset, OIRA and its predecessor organizations were under constant legal and political attack and scrutiny. These actions engulfed OIRAs resources. It was hardly the ideal time to expand the mission of an organization when its very existence was in question. A related reason for the delay is that OIRA underwent a long series of personnel reductions which resulted in its staff being halved.

Another reason for the delay in implementing an RB was the minimal attention given to the competitive nature of the bureaucratization of governmental functions (Tozzi & Levinson, 2014). Agencies which fail to provide utility to one or more constituencies – constituencies which may have changing demands – will vanish overtime.

In implementing an RB, OIRA has reignited some of its entrepreneurial, risk-taking attributes. However, it still needs to address several ominous long-term threats.

3.4.1 Examination of alternative methods for controlling the cumulative cost of regulation

There are alternatives to regulatory budgeting for controlling the cumulative cost of regulations. An article which examines multiple policy options while considering fundamental reforms to OIRA's status quo explained:

(i) "Over three decades ago, the United States was at the forefront of developed nations in creating a centralized system for regulatory review and rationalizing regulatory policymaking through the use of benefit-cost analysis. As catalogued elsewhere on this site, the idea of centralized executive review of agency rules first began to take shape during the Johnson Administration, and it fully matured in its present form in the early days of the Reagan Administration. Presidents George H.W. Bush, Bill Clinton, George W. Bush, and Barack Obama have all fundamentally reaffirmed the basic framework President Reagan created, which involves benefit-cost analysis of pending rules and centralized review of significant regulations by the Office of Information and Regulatory Affairs (OIRA). Though the system that has emerged still provokes controversy, most have accepted the inevitability and desirability of some form of executive review" (Bull, 2015, p. 1).

(ii) "In the ensuing thirty years, the United States' system for executive review has changed very little, notwithstanding some minor readjustments. In that

same time period, other developed nations have enacted significant regulatory reforms, some of which involve copying the American framework but many of which represent new innovations that go well beyond what the United States has adopted" (Bull, 2015, p. 1).

(iii) "If the United States is to succeed in controlling the cumulative regulatory burden, then it must consider fundamental reforms to the status quo. Existing regulatory impact analysis mandates and OIRA review play a critical role in combating overregulation and containing the costs of the regulatory state, but they alone are inadequate to control ever-increasing regulatory costs. In contemplating potential reforms, the United States fortunately needn't start from scratch, as many developed nations have undertaken significant regulatory overhauls in recent years. By observing what has worked well overseas, the United States can learn from and ideally build upon foreign innovations, refashioning international best practices to fit the American context" (Bull, 2015, p. 2).

The author analyzes a number of different approaches for controlling cumulative costs. In response to some of the paper's conclusions reached therein it should be noted that the prototype RB developed by the Carter Administration:

(i) Did not include a "one in-two out" provision (Grossman, 2017).

(ii) Incorporated benefits into the RB much in the same way they are used in the fiscal budget; regulations available for promulgation were ranked in a descending order of net benefits and those incorporated into the budget were those with a total cost equal to the allowable increase in government-wide regulatory expenditures working downward on the aforementioned ranking of candidate regulations.

The operating philosophy of the RB of the Carter Administration paralleled that of the fiscal budget employed by Administrations of both parties over a number of decades – namely that there was never a planned retrenchment of the regulatory state but instead a control of its rate of growth something akin to the ever increasing size of the federal deficit espoused by both political parties.

Although alternatives to RBs are worth exploring, regulatory budgeting remains the default strategy for controlling cumulative regulatory costs until such time as it becomes apparent that an alternative method would be more effective.

3.4.2 OIRA is losing its status as the world leader in regulatory innovation

It is worth noting that OIRA has regained much of its standing by implementing an RB, mobilizing the DQA, rejuvenating the Congressional Review Act and initiating the

review of tax regulations (University of Minnesota Law School, 2018). Notwithstanding the massive reduction in its staff level that has been inflicted on OIRA since its establishment, it should consider serving as a catalyst for the U.S. Government's participation in the ongoing international debate regarding regulation of social media (Tozzi, 2019*d*).

3.4.3 Critics of a RB have raised legitimate concerns which have to be addressed in a public forum

One of the most widely expressed concerns about RBs is that they do not consider benefits. Although Section 3.2. explains that other countries are successfully implementing RBs without explicitly incorporating a benefits analysis, this remains one of the regulatory budgeting issues that needs to be addressed through a series of open forums and workshops.

Since it is not mandatory that an RB include a "One-in, Two-out provision" another issue to be examined is the conditions under which such a provision is compliant with the APA.

Lastly, is a regulatory budget an alternative to adding procedural requirements to the regulatory process (Tozzi, 2017*b*)?

The aforementioned issues as well as others identified in this section dealing with the implementation of an RB should be addressed in a number of fora (Elliott, 2017; Tozzi, 2019*c*; White, 2019). OIRA should take the lead by issuing an RFI, a request for information, from think tanks, NGOs, and stakeholder organizations (CRE, Unfinished Business, n.d.).

3.5 Next steps

3.5.1 Designation of Iconic Executive Orders by the Archivist of the USA

Throughout the years many Executive Orders have been issued. A select few of these Executive Orders have withstood the test of time and are not only on the books but are directing major regulatory programs. These select Executive Orders should be designated as "Iconic" by the Archivist. Such a designation would result in a rebuttable presumption against revocation.

3.5.2 Issuance of an Executive Order on the interagency review of Executive Orders

Presently Executive Order 11030 designates OMB as the agency in charge of the interagency review of proposed Executive Orders. This Executive Order was written prior to establishment of OIRA. The Executive Order should be replaced with one which gives OIRA a well-defined role in the review of Executive Orders.

3.5.3 Issuance of an Executive Order which ensures a consistency between the use of benefit-cost analyses performed for regulatory and non-regulatory programs in the Federal Government

For federal regulatory programs existing federal policy results in the promulgation as a final rule of any and all proposed rules whose benefits exceed their costs.

For federal capital construction projects, the demonstration of positive net benefits is a necessary but not sufficient condition for the execution of a project. In addition to demonstrating that the benefits of the project exceed its costs a proposed project must be included in the federal budget and therefore subject to a government-wide comparison of its merits relative to its competitors.

Subsequent to seeking public comment on Executive Order 13771, a revised Executive Order should be issued which amends the Executive Order to address validated deficiencies in the RB as presently implemented. The revised Executive Order should also:

 (i) establish as federal policy that the demonstration of positive net benefits for a proposed regulation is a necessary but not sufficient condition for promulgation as a final rule; and
(ii) state that a proposed rule must be included in an RB before it is promulgated as a final rule. The failure to adopt the aforementioned policy is tantamount to establishing the said regulation as an entitlement because its funding is guaranteed by levying a *de facto* tax on the public just because it meets some preconceived metric.

OIRA has paid its dues; it should graduate from its activities devoted primarily to being a benefit-cost cop to the manager of the federal regulatory machine which requires a simultaneous examination of all proposed rules, as is the case with an RB. Such a process change would allow OIRA to reward those programs and agencies which adhere to established procedures for the conduct of benefit-cost analyses and would also encourage the beneficiaries of one rule to challenge the overly optimistic benefit estimates of its competitors.

References

Appelbaum, Binyamin. 2019. *The Economists' Hour: False Prophets, Free Markets, and the Fracture of Society.* New York, NY: Little, Brown and Company

Appelbaum, Binyamin, and Michael D. Shear. 2016. "Once Skeptical of Executive Power, Obama Has Come to Embrace It." *The New York Times*, August 13, 2016. Available at https://www.nytimes.com/2016/08/14/us/politics/obama-era-legacy-regulation.html?_r=1.

Bagley, Nicholas, and Richard L. Revesz. 2006. "Centralized Oversight of the Regulatory State." *Columbia Law Review*, 106: 1260.

Behr, Peter. 1981. "If There's a New Rule, Jim Tozzi Has Read It." *The Washington Post*, July 10, 1981. Available at http://thecre.com/pdf/20160228_tozzi.pdf.

Bentsen, Lloyd M. 1979. A bill to Amend the Congressional Budget Act of 1974 to Require the Congress to Establish, for each Fiscal Year, a Regulatory Budget for each Federal Agency which sets the Maximum Costs of Compliance with All Rules and Regulations Promul-gated by that Agency, and for Other Purposes. Available at http://www.thecre.com/forum2/wp-content/uploads/2015/08/S-51-2.pdf.

Bergeson, Lynn L., and Lisa M. Campbell. 2001. "The Tozzi Decision: Another Arrow in Manufacturers' Quiver in Product Defense Wars." *EPA Administrative Law Reporter*, 18 (5): 573.

Bosch, Dan. 2018. "Two Months to Go: Regulatory Budget Progress, American Action Forum." *Insight*, August 13, 2018. Available at https://www.americanactionforum.org/insight/two-months-to-go-regulatory-budget-progress/.

Breyer, Stephen. 1995. *Breaking the Vicious Circle: Toward Effective Risk Regulation.* Cambridge, MA: Harvard University Press.

Bull, Reeve T. 2015. Controlling the Cumulative Costs of Regulation: Exploring Potential Solutions. Available at www.thecre.com/forum2/wp-content/uploads/2015/10/Bull-Article.pdf

Bush, George W. 2002. Executive Order 13258 – Amending Executive Order 12866 on Regulatory Planning and Review, February 26, 2002. Available at https://www.presidency.ucsb.edu/documents/executive-order-13258-amending-executive-order-12866-regulatory-planning-and-review.

Bush, George W. 2007. Executive Order 13422 – Further Amendment to Executive Order 12866 on Regulatory Planning and Review, January 18, 2007. Available at https://www.presidency.ucsb.edu/documents/executive-order-13422-further-amendment-executive-order-12866-regulatory-planning-and.

Carter, Jimmy. 1978. Executive Order 12044 – Improving Government Regulations, March 23, 1978. Available at https://www.presidency.ucsb.edu/documents/executive-order-12044-improving-government-regulations.

Carter, Jimmy. 1981. State of the Union Address, January 16, 1981. Available at https://www.jimmycarterlibrary.gov/assets/documents/speeches/su81jec.phtml.

Center for Regulatory Effectiveness (CRE), CCCR. n.d. Controlling the Cumulative Costs of Regulation. Available at http://www.thecre.com/forum2/?p=939.

Center for Regulatory Effectiveness (CRE), OMB Papers. n.d. Review of Review: OMB Papers on Centralized Regulatory Review. Available at http://thecre.com/ombpapers/Obama_review.html.

Center for Regulatory Effectiveness (CRE), Unfinished Business. n.d. OMB Papers on Centralized Regulatory Review, Unfinished Business. Available at http://www.thecre.com/ombpapers/unfinished.htm.

Council on Foreign Relations. 2015. Renewing America: Progress Report and Scorecard, Quality Control: Federal Regulation Policy, March 2015, p. 9. Available at http://i.cfr.org/content/publications/attachments/Federal Regulation Report.pdf.

Crews, Clyde Wayne. 1996. Promise and Peril: Implementing a Regulatory Budget, Competitive Enterprise Institute, April 1996. Available at http://www.thecre.com/forum2/wp-content/uploads/2015/08/Promise-and-Peril-Wayne-Crews.pdf.

DeMuth, Christopher C. 1980. "Constraining Regulatory Costs – Part II: The Regulatory Budget." *The American*, April 6, 1980. Available at https://www.aei.org/publication/constraining-regulatory-costs-part-ii-the-regulatory-budget/.

DeMuth, Christopher C. 2011. "OIRA at Thirty." *Administrative Law Review*, 63(Special Edition): 15–25.

Dieterle, C. Jarrett. 2017. "Lessons from the Godfather of Regulatory Budgeting." *The Hill*, February 23, 2017. Available at http://thecre.com/pdf/20170226_hill.pdf.

Dodds, Graham G. 2008. "By Order of George W. Bush: The Unilateral Directives of a Unilateralist President." *The American Review of Politics*, 29(Fall): 197–213.

Doern, G. Bruce. 2009. A Regulatory Budget and a Strategic Regulatory Agenda: Twin Reforms for More Strategic, Integrated and Democratic Regulatory Governance, Regulatory Governance Brief, No. 1, Carlton University, January 2009. Available at http://www.thecre.com/forum2/wp-content/uploads/2015/08/Reg-Budget-Doern1.pdf.

Dudley, Susan E. 2016. "Can Fiscal Budget Concepts Improve Regulation?" *Legislation and Public Policy,* 19: 259. Available at http://www.nyujlpp.org/wp-content/uploads/2016/06/Dudley-Can-Fiscal-Budget-Concepts-Improve-Regulation-19nyujlpp259.pdf.

Elliott, E. Donald. 2017. "President Trump Establishes Regulatory Budgets by Executive Order." *Inside Energy & Environment*, February 1, 2017. Available at https://www.insideenergyandenvironment.com/2017/02/president-trump-establishes-regulatory-budgets-by-executive-order/.

Emery, Andrew, and Susan Prosnitz. 2018. "American Bar Association/Section of Administrative Law and Regulatory Practice." In *Administrative Law Conference*, Washington, DC, November 1–2, 2018. Available at https://www.thecre.com/oira/wp-content/uploads/2018/11/ABAAdLawConference-AgendaNovember2018.pdf.

Eckstein, Otto. 1958. *Water Resource Development – The Economics of Project Evaluation*. Cambridge, MA: Harvard University Press.

Ford, Gerald R. 1974. Executive Order 11821 – Inflation Impact Statements, November 27, 1974. Available at https://www.presidency.ucsb.edu/documents/executive-order-11821-inflation-impact-statements.

Fuchs, Ralph F. 1938. "Procedure in Administrative Rule-Making." *Harvard Law Review*, 52: 259–280.

Goad, Benjamin. 2014. "Rubio Wants 'National Regulatory Budget'." *The Hill*, March 10, 2014. Available at https://thehill.com/regulation/pending-regs/200351-rubio-pitches-budget-for-federal-regulations.

Graham, John D., and Cory R. Liu. 2014. "Regulatory and Quasi-Regulatory Activity without OMB and Benefit-Cost Review." *Harvard Journal on Legislation*, 37: 425, 426, 445.

Granquist, Wayne G., and Jim Tozzi. 1980. Statement on H.R. 6410 Paperwork Reduction Act of 1980 before a Subcommittee of the Committee on Government Operations, U.S. House of Representatives, Ninety-sixth Congress (Second Session), February 7, 21, and 26, 1980. Available at http://www.thecre.com/ombpapers/PaperWorkReductionAct.htm.

Gray, C. Boyden. 2017. "The President's Constitutional Power to Order Cost-Benefit Analysis and Centralized Review of Independent Agency Rulemaking." *Mercatus Working Paper*, May 31, 2017. Available at https://www.mercatus.org/publications/cost-benefit-analysis-centralized-review-independent-agency-rulemaking-trump.

Grossman, Andrew M. 2017. "An Administration Takes Sides." *36 Yale Journal on Regulation: Notice & Comment*, May 25, 2017. Available at http://yalejreg.com/nc/an-administration-takes-sides-by-andrew-m-grossman/.

Hamilton, Walton H. 1919. "The Institutional Approach to Economic Theory." *The American Economic Review*, 9(1): 309–318.

Hopkins, Thomas, and Laura Stanley. 2015. "The Council on Wage and Price Stability: A Retrospective." *Journal of Benefit Cost Analysis*, 6(2): 400–431.

Johnston, Jason Scott. 2002. "A Game Theoretic Analysis of Alternative Institutions for Regulatory Cost-Benefit Analysis." *University of Pennsylvania Law Review*, 150: 2002.

Jones, Laura. 2015. "Regulatory Reform: Lessons from Canada.*" Real Clear Policy*, December 20, 2015. Available at https://www.mercatus.org/expert_commentary/regulatory-reform-lessons-canada.

Katzen, Sally. 2011. "OIRA at Thirty: Reflections and Recommendations." *Administrative Law Review*, 63(Special Edition): 103–112.

Kennedy, John F. 1962. Executive Order 11030 – Preparation, Presentation, Filing, and Publication of Executive Orders and Proclamations, June 19, 1962. Available at https://www.archives.gov/federal-register/codification/executive-order/11030.html.

Kirschten, Dick. 1983. "The Twenty Years War." *National Journal*, June 11, 1983. Available at http://thecre.com/pdf/20_Years_War.pdf.

Kundu, Tapas, and Tore Nilssen. 2018. *Delegation of Regulation*. Oslo, Norway: Oslo University, Department of Economics.

Kwak, James. 2019. "How Economists Turned All of Society into a Market." *Washington Post*, September 19, 2019. Available at https://www.washingtonpost.com/outlook/how-economists-turned-all-of-society-into-a-market/2019/09/19/c5e2faac-be0b-11e9-a5c6-1e74f7ec4a93_story.html.

Laffon, Jean-Jacques, ed. 2003. *The Principal Agent Model: The Economic Theory of Incentives*. Cheltenham, UK: Edward Elgar Publishing.

Lee, Mike. 2014. Regulatory Cost Assessment Act of 2014. Available at http://www.thecre.com/oira_reg/?p=7995.

Lee, Mike. 2016. Article I Regulatory Budget Act of 2016. Available at https://www.congress.gov/bill/114th-congress/senate-bill/2982/.

Listokin, Yair. 2014. "Bounded Institutions." *Yale Law Journal*, 124(2): 339.

Lubbers, Jeffrey S. 2018. *A Guide to Federal Agency Rule Making*, 6th ed. Chicago, IL: American Bar Association.

Ludlam, Chuck. 2003. Oral History Project, The Senate Legal Counsel, Interview #1, United States Senate. Available at https://www.senate.gov/artandhistory/history/resources/pdf/Ludlam_Interview1.pdf.

Marshall, Edward G. 1982. The Regulators: Our Invisible Government, WVIA-TV; Learning Corporation of America. Available at http://www.thecre.com/forum8/?p=1660.

Mashaw, Jerry L., and David Berke. 2018. "Presidential Administration in a Regime of Separated Powers." *Yale Journal of Regulation*, 35: 549.

McLaughlin, Patrick A. 2015. "Bold Regulatory Reform Is Necessary for Economic Growth." *National Review*, September 25, 2015. Available at https://www.nationalreview.com/2015/09/jeb-bush-regulatory-reform/.

Meadows, Mark. 2017. H.R.2623 – Lessening Regulatory Costs and Establishing a Federal Regulatory Budget Act of 2017. Available at https://www.congress.gov/bill/115th-congress/house-bill/2623/text.

Metzger, Gillian E., and Kevin M. Stack. 2017. "Internal Administrative Law." *Michigan Law Review*, 115(8): 2017.

Miller, Gary J. 2005. "The Political Evolution of Principle-Agent Models." *Annual Review of Political Science*, 8: 203–225.

Miller, James C. 2011. "The Early Days of Reagan Regulatory Relief and Suggestions for OIRA's Future." *Administrative Law Review*, 63(Special Edition): 93–101.

Morrison, Alan B. 1986. "The Administrative Procedure Act: A Living and Responsive Law." *Virginia Law Review*, 72(2): 253–270.

Newbold, Stephanie P., and Larry D. Terry. 2006. "The President's Committee on Administrative Management: The Untold Story and the Federalist Connection." *Administration & Society*, 38(5): 2006.

Nielson, Aaron. 2017. Sticky Regulations, University of Chicago Law Review, Forthcoming; BYU Law Research Paper No. 17-11. Available at https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2950732.

Pierce, Richard J. 2017. The Regulatory Budget Debate. GWU Law School Public Law Research Paper No. 2017-30; GWU Legal Studies Research Paper No. 2017-30, pp. 8–9. Available at https://papers.ssrn.com/abstract=2952418.

Pierce, Richard J. 2019a. Takeaways from the Conference on the Future of White House Regulatory Oversight and Cost-Benefit Analysis GW Law School Public Law and Legal Theory Paper No. 2019-60; GW Legal Studies Research Paper No. 2019-60. Referenced from https://poseidon01.ssrn.com/delivery.php?ID=865073071082095102107107072109081123118075037049086025106123082112115008098114095103020013021100008051030007122114094102020106051055054015028095064013030005014087056058054092093066097087010105123094120108076123015092119076030069025097100082112001104&EXT=pdf.

Pierce, Richard J. 2019b. Is a Ceiling on Regulatory Costs Reasonable? The Regulatory Review Sep 30, 2019. Referenced https://www.theregreview.org/2019/09/30/pierce-ceiling-regulatory-costs/.

The President's Committee on Administrative Management. 1937. Report of the Committee with Studies of Administrative Management in the Federal Government, Government Printing Office. Available at https://babel.hathitrust.org/cgi/pt?id=uiug.30112104110959;view=1up;seq=3.

Rasso, Connor. 2018. Report: Trump's Deregulatory Efforts Keep Losing in Court – And the Losses Could Make it Harder for Future Administrations to Deregulate, Brooking Institution Center on Regulation and Markets, October, 25, 2018. Available at https://www.brookings.edu/research/trumps-deregulatory-efforts-keep-losing-in-court-and-the-losses-could-make-it-harder-for-future-administrations-to-deregulate/.

Reagan, Ronald. 1981. Executive Order 12291 – Federal regulation, February 17, 1981. Available at https://www.archives.gov/federal-register/codification/executive-order/12291.html.

RCAA. 1980. Regulatory Cost Accounting Act of 1980 (proposed). Available at http://www.thecre.com/ombpapers/RegCostAccounting1980.htm.

Rosen, Jeffrey A., and Brian Callanan. 2014. "The Regulatory Budget Revisited." *Administrative Law Review*, 66: 4.

Rosen, Jeff. 2015. "Ongoing Interest in Regulatory Cost Budgets." *36 Yale Journal on Regulation: Notice & Comment*, December 10, 2015. Available at http://yalejreg.com/nc/ongoing-interest-in-regulatory-cost-budgets-by-jeff-rosen/.

Rosen, Jeff. 2016a. American Bar Association/Section of Administrative Law Council Meeting Agenda – August 6, 2016. Available at https://www.americanbar.org/content/dam/aba/administrative/administrative_law/council_agenda_with_materials_aug%206.pdf.

Rosen, Jeff. 2016b. "Putting Regulators on a Budget." *National Affairs*, 27(Spring): 2016.

Rothman, Lily. 2017. "9 Executive Orders That Changed American History." *Time Magazine*, February 6, 2017. Available at https://time.com/4655131/executive-orders-history/.

Rudalevige, Andrew. 2017. "Beyond Structure and Process: The Early Institutionalization of Regulatory Review." Paper prepared for the *Annual Meeting of the Midwest Political Science Association*, Chicago, Illinois, April 2017. Available at http://www.thecre.com/forum8/wp-content/uploads/2017/05/Professor-Rudalevige.pdf.

Schmid, A. Allan. 1969. Effective Public Policy and the Government Budget: A Uniform Treatment of Public Expenditures and Public Rules, The Analysis and Evaluation of Public Expenditures: The PPB System, A compendium of Papers submitted to the Subcommittee on Economy in Government of the Joint Economic Committee, Congress of the United States. Volume 1, 91st Congress, 1st Session, 1969, pp. 579-591. Available at www.thecre.com/pdf/Schmid.PDF.

Shane, Peter M. 2011. "The White House Role in Regulatory Policy Making: Time for a Change?" *Huffington Post*, May 25, 2011. Available at https://www.huffingtonpost.com/peter-m-shane/the-white-house-role-in-r_b_172290.html.

Shultz, George P. 1971. Memorandum for the Heads of Departments and Agencies, "Agency regulations, standards, and guidelines pertaining to environmental quality, consumer protection, and occupational and public health and safety," October 5, 1971. Available at http://www.thecre.com/ombpapers/QualityofLife1.htm.

Simms, Larry L. 1981. US Department of Justice, Office of Legal Counsel Memorandum, "Proposed Executive Order entitled Federal Regulation," February 13, 1981. Available at http://www.thecre.com/pdf/DJMemoReaganEO12291PDF.pdf.

Smith, Adam. 1852. *An Inquiry into the Nature and Causes of Wealth of Nations*. London, UK: T. Nelson and Sons.

Speer, Sean. 2016. Regulatory Budgeting: Lessons from Canada, R Street Policy Study No. 54, March 2016. Available at http://www.thecre.com/forum2/wp-content/uploads/2015/08/Reg-Budget-R-Street.pdf.

Sunstein, Cass R. 2018. *The Cost-Benefit Revolution*. Cambridge, MA: The MIT Press.

Tozzi, Jim, J. 1966. An Optimum Mix of Heterogeneous Weapons Systems, Chairman Joint
    Chiefs of Staff Study Group, 1966. Available at https://thecre.com/pdf/An_Optimum_
    Mix_of_Heterogeneous_Weapons_Systems.pdf.

Tozzi, Jim. 1969. Establishing Priorities for Public Investments (Interim Report), Office of the
    Secretary of the Army, Systems Analysis Group (Civil Functions), June 1969, Abstract.
    Available at https://apps.dtic.mil/docs/citations/AD0689513.

Tozzi, Jim, ed. 1979. Towards a Regulatory Budget: A Working Paper on the Cost of Federal
    Regulation. Available at http://www.thecre.com/ombpapers/regbudget.html.

Tozzi, Jim. 2009. Jim Tozzi Views on Centralized Regulatory Review, National Archives
    Interview, March 2009. Available at http://thecre.com/video/National_Archive.html.

Tozzi, Jim. 2011. "OIRA Formative Years: The Historical Record of Centralized Regulatory
    Review Preceding OIRA's Founding." *Administrative Law Review*, 63(Special Edition):
    44–50.

Tozzi, Jim. 2015. Controlling the Cumulative Cost of Regulations, August 27, 2015. Available
    at http://www.thecre.com/forum2/?p=939.

Tozzi, Jim. 2016. "The Coming of the Regulatory Budget." *The Regulatory Review*, January
    8, 2016. Available at https://www.theregreview.org/2016/01/08/tozzi-regulatory-budget/.

Tozzi, Jim. 2017*a*. Gaming the Giveth and Taketh of Government, March 25, 2017. Available
    at http://www.thecre.com/forum8/wp-content/uploads/2017/03/Gaming-the-Giveth-and-
    Taketh-of-Government.pdf.

Tozzi, Jim. 2017*b*. An Alternative to the Regulatory Accountability Act? OIRA Watch, May
    25, 2017. Available at http://www.thecre.com/oira/?p=7007.

Tozzi, Jim. 2017*c*. The Evolution of Benefit-Cost Analysis into Federal Rulemaking,
    Regulatory Pacesetters, August 16, 2017. Available at http://www.thecre.com/forum8/?
    p=724.

Tozzi, Jim. 2017*d*. A Half-Century of Centralized Regulatory Review, Regulatory Paceset-
    ters, September 29, 2017. Available at http://www.thecre.com/forum8/?p=1092.

Tozzi, Jim. 2017*e*. Contributions: Center for Regulatory Effectiveness, Regulatory
    Pacesetters, December 3, 2017. Available at https://www.thecre.com/forum8/?page_
    id=1942.

Tozzi, Jim. 2018*a*. "A Regulatory Budget Is the Linchpin for the Creation of a National
    Constituency for OIRA." *36 Yale Journal on Regulation: Notice & Comment*, April
    4, 2018. Available at http://yalejreg.com/nc/a-regulatory-budget-is-the-linchpin-for-the-
    creation-of-a-national-constituency-for-oira-by-jim-tozzi/.

Tozzi, Jim. 2018*b*. CRE's Emphasis on Data Access and Data Quality is Rooted in the
    Paperwork Reduction Act Amendments of 1995, Regulatory Pacesetters, June
    11, 2018. Available at http://www.thecre.com/forum8/?p=2157.

Tozzi, Jim. 2018*c*. A Library of Selected Works Which Provide a Basis for the Retention of
    an Executive Order Based on a Retrospective Review of Executive Order 12291,
    Regulatory Pacesetters, September 4, 2018. Available at http://www.thecre.com/
    forum8/?p=2726.

Tozzi, Jim. 2018*d*. The Potpourri of Executive Orders, Regulatory Pacesetters, October
    6, 2018. Available at http://www.thecre.com/forum8/?p=2970.

Tozzi, Jim. 2019*a*. Is OIRA a Manifestation of the Principles Enunciated by Professor Jerry
    Mashaw? Regulatory Pacesetters, February 17, 2019. Available at http://www.thecre.
    com/forum8/?p=3291.

Tozzi, Jim. 2019*b*. "Benefit-Cost Analysis and the Regulatory Budget." *36 Yale Journal on Regulation: Notice & Comment*, March 11, 2019. Available at http://yalejreg.com/nc/benefit-cost-analyses-and-the-regulatory-budget-by-jim-tozzi/.

Tozzi, Jim. 2019*c*. Management of the Administrative State, Regulatory Pacesetters, June 25, 2019. Available at http://www.thecre.com/forum8/?p=3637.

Tozzi, Jim. 2019*d*. FINRA: A Prototype for US Regulation of the Social Media, Regulation of the Social Media – A Library, July 25, 2019. Available at http://thecre.com/RegSM/2019/07/25/insert/.

Tozzi, Jim, and Bruce Levinson. 2014. "Accomplishment Beyond Dollars." *The Environmental Forum*, 311: 2014.

United Kingdom, Department for Business Innovation & Skills. 2014. The Ninth Statement of New Regulation: Better Regulation Executive, December 2014. Available at https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/397237/bis-14-p96b-ninth-statement-of-new-regulations-better-regulation-executive.pdf.

United States Department of Agriculture, Food and Nutrition Service, Food Distribution Program on Indian Reservations (FDPIR). Available at https://www.fns.usda.gov/fdpir/food-distribution-program-indian-reservations-fdpir.

United States Senate Homeland. 2015. Committee on Homeland Security and Governmental Affairs and the Committee on the Budget Hearings, Accounting for the True Cost of Regulation: Exploring the Possibility of a Regulatory Budget, June 23, 2015. Available at https://www.hsgac.senate.gov/hearings/measuring-the-true-cost-of-regulations-lessons-from-great-britain-and-canada-on-implementing-regulatory-reforms.

United States Senate Joint. 2015. Senate Budget & Homeland Security and Government Affairs Committees to Account for True Cost of Regulations, June 23, 2015. Available at https://www.budget.senate.gov/hearings/joint-hearing-by-senate-budget-and-homeland-security-and-government-affairs-committees-to-account-for-true-cost-of-regulations.

University of Minnesota Law School. 2018. Prof. Hickman Named Special Adviser to OIRA, April 18, 2018. Available at https://www.law.umn.edu/news/2018-04-18-prof-hickman-named-special-adviser-oira.

Verkuil, Paul R. 1980. "Jawboning Administrative Agencies: Ex Parte Contacts by the White House." *Columbia Law Review*, 80(5): 943.

Vitarelli, Anthony. 2010. "Happiness Metrics in Federal Rulemaking." *Yale Journal of Regulation*, 27(1): 5.

Walker, Christopher J. 2017. "Lawmaking Within Federal Agencies and Without Judicial Review." *Journal of Land Use & Environmental Law*, 32: 551–565.

Weingast, Barry R. 1984. "The Congressional-Bureaucratic System: A Principle Agent Perspective (with Application to the SEC)." *Public Choice*, 44: 147–191.

White, Adam J. 2018. "Executive Orders as Lawful Limits on Agency Policymaking Discretion." *Notre Dame Law Review*, 93: 1569.

White, Adam J. 2019. "Regulatory Reforms and Counter-Reformations." *The Regulatory Review*, March 12, 2019. Available at https://www.theregreview.org/2019/03/12/white-regulatory-reforms/.

Wood, Lance D., Elliot P. Laws, and Barry Breen. 1981. "Restraining the Regulators: Legal Perspectives on a Regulatory Budget for Federal Agencies." *Harvard Journal on Legislation*, 18: 1.

James C. Miller III

Jim Tozzi's Latest on Centralized Regulatory Review

Jim Tozzi is a legend and a treasure. Who better to reflect upon the history of, the significance of, and the prospects for centralized regulatory review (CRR)?

Tozzi's previous writings covered much of the history of CRR. In this current assessment, Tozzi (2019) makes several important points. The first is that the development and success of the Office of Information and Regulatory Affairs (OIRA) can be traced to bipartisan support, starting with Presidents Kennedy and Johnson and then the push given by President Nixon at the hand of George Shultz ("Quality of Life Review"). Of special mention is the bipartisan commission, which enabled the passage of the Paperwork Reduction Act, and the signing of that Act by President Carter, contrary to the wishes of all his Cabinet members, save his Budget Director.

The question that developed over this period was not *whether* there should be a major escalation in attempts to constrain the growth and improve the quality of federal regulation, but *just how those goals should be accomplished.* Almost all serious observers of regulatory activity recognized that agencies were prone to regulate too much and mandate means that were not particularly cost-effective. With regulatory activity growing exponentially, something had to be done.

Several approaches were evident. One was to institutionalize the coordination of agency regulatory activities. In the minds of many, a great deal of waste was caused by duplication of efforts and inconsistencies in approaches. Another approach was the undertaking of strict benefit-cost analyses of proposed regulations by an independent entity. The old Council on Wage and Price Stability as a whole worked on coordination, while its government office, originally led by George Eads, analyzed major regulatory proposals and published their results.

These approaches proved helpful, but not sufficient. Agencies paid a lot of lip service to coordination and improving regulations, but largely went their own ways. What was needed was a firm hand: an entity that could tell an agency "NO" and have that decision stick. Moreover, the entity needed to explain what constituted acceptable regulation and to help agencies understand the standards that would be used to

James C. Miller III: King & Spalding LLC, New York, NY, USA, e-mail: jim@jimmiller.org
James C. Miller is Senior Adviser at King & Spalding LLC. He served as the very first administrator of OMB's Office of Information and Regulatory Affairs (OIRA) in 1981.

approve or disapprove their regulatory proposals. Serving that purpose was what Order (E.O.) 12291 was meant to accomplish. Office of Management and Budget (OMB's) staff would utilize its analytical expertise and (later) its new OIRA powers – all under the overall guidance of the Presidential Task Force on Regulatory Relief, chaired by Vice President Bush.

At this point, nothing so comprehensive and superior as a regulatory budget received serious consideration. The notion of *centralized* review was controversial within the executive branch and was seen by many in Congress to be supplanting the oversight responsibilities and powers to which they were accustomed. What saved the day was President Reagan's determination to effect "regulatory relief" – one of the four elements of his program of economic reform – and Vice President Bush's decision to exclude the so-called independent agencies from executive review, a particularly sensitive point with Congress.

As Tozzi notes, subsequent refinements of the program initiated by E.O. 12291 have been made by presidents of both parties. OIRA has been led by persons of great distinction, buttressed by an extraordinarily skillful staff. And despite repeated legal challenges and other efforts to undermine the program (E.O. 21866-enabled), Centralized Regulatory Review (CCR) has survived and served the public well for nearly four decades.

Now may be the time for another significant improvement in federal regulation, however. Most promising would be a full-blown regulatory budget. The benefits of budgeting are well-known. As shocking as it sounds, before 1922, there was no central federal financial budget: agencies proposed their budgets directly to Congress. Today, one would scoff at the notion a financial budget is not needed.

The arguments against a regulatory budget are not compelling. Each argument could be made against the financial budget. The most frequently voiced is, "It's all about costs, not benefits." Yes, to a degree, but so is the financial budget. The benefits of spending are discussed and evaluated by Congress, the Administration, and the public each and every year. But surely no serious person would question the aggregating of costs and the setting of priorities that takes place on the financial side. Why not on the regulatory side?

There are complications about which costs to consider, however. Tozzi describes a regulatory budget as "a ceiling on the total incremental cost of complying with regulations…" repeating the language in President Trump's E.O. 13771. Presumably, this is the cost above what would be experienced in the absence of the relevant regulations. But, what costs actually would be included in a regulatory budget approved by Congress (and the president) each year? The costs already in place plus the truly *incremental* costs – those that could be added? Or just the latter? A reference to the financial budget may be helpful. "Entitlements" (including interest and suchlike), which presently account for over half of all spending, are included in the federal

financial budget but are not "appropriated" each year. Would a regulatory budget include only *additional* costs imposed by *new* regulations? What about additional costs imposed by regulations already promulgated but taking effect in the year in question – are these to be treated as incremental costs or treated like "entitlements"?

Whatever the complications, they can be addressed. And the resulting implementation could greatly decrease the cost and increase the utility of the nation's regulatory program. Perhaps the day will come (in our lifetimes, one would hope!) when we will all scoff at the notion of *not* having a regulatory budget.

Tozzi makes other points that are worth stressing. His description of a United States Department of Agriculture (USDA) rule increasing the nutritional value of school lunches is to the point: "In this instance, regulators are levying a unilateral *de facto* tax on the general public to finance benefits to a specific class of program beneficiaries. Why should not the magnitude of the tax be a decision of elected officials on a government-wide basis in a transparent manner in lieu of being made on a case by case basis by unelected officials in an opaque manner?" Which itself is a grand argument for a full-blown regulatory budget.

One can sympathize with Tozzi's concern over the permanence of the regulatory Executive Orders, especially the "iconic" ones. After all, without these Executive Orders, there is no CRR. But, I demur over his proposal to impede a new president by having to "submit proposed revocations of regulatory-related Executive Orders to the career specialists at OIRA." A new administration would be foolish not to do so. And a new Executive Order telling a president she or he cannot revoke an existing Executive Order *would* be foolish. Given the success of modern CRR, no president is going to revoke the regulatory-related Executive Orders.

Reference

Tozzi, Jim. 2019. "Office of Information and Regulatory Affairs: Past, Present, and Future." *Journal of Benefit-Cost Analysis*, 11(1). doi:10.1017/bca.2019.26

Christopher DeMuth*

Commentary on Jim Tozzi, "Office of Information and Regulatory Affairs: Past, Present, and Future"

Jim Tozzi is an activist institutional economist. During his 19-year career in the federal civil service, he was a pertinacious institution builder, armed with a PhD in economics but never flaunting it. He gained a reputation, richly deserved in my experience, as a supreme bureaucratic tactician. But he applied his skills to antibureaucratic purposes. Incessantly, and occasionally at professional risk, he promoted and protected internal executive-branch procedures that used economic analysis, and measures of administrative effectiveness, against the incessant forces of political entropy, agency parochialism, and special-interest capture.

Tozzi's purposes and methods are vividly on display in "Office of Information and Regulatory Affairs: Past, Present, and Future" (2019). He is impressed by the durability of White House review of agency regulations under an increasingly explicit cost-benefit ("maximum net benefits") standard. The practice is wholly discretionary, with no statutory basis and no particular congressional or political constituency, yet it has been followed since the early 1970s by nine presidents of both parties and all points on the political spectrum. That is something of a puzzle, and also a caution. The practice has been indubitably beneficial and has come to play a central role in regulatory policy-making – but it draws the Office of Management and Budget (OMB) into an endless stream of highly charged political controversies, and it could be extinguished by the stroke of a presidential pen or by simple neglect and desuetude.

This leads Tozzi to recommend three measures for buttressing White House regulatory oversight. The first is that the National Archives officially recognize "Iconic Executive Orders," beginning with Ronald Reagan's Executive Order 12291 (1981). That order was certainly the decisive regulatory innovation, first establishing the cost-benefit analysis requirement and maximum net benefits standard as presidential policies that were to long endure. But, at the Archives, there would be considerable competition for iconic status, and regulatory efficiency would

---

*Christopher DeMuth is a distinguished fellow at the Hudson Institute. He was chairman of the White House Environmental Policy Task Force in 1969–1970 and administrator of the Office of Information and Regulatory Affairs, Office of Management and Budget, in 1981–1984, when Jim Tozzi was a deputy administrator in 1981–1983.

Christopher DeMuth: Distinguished Fellow, Hudson Institute, 1201 Pennsylvania Avenue, N.W.,Washington, DC 20004, 202-974-6451, e-mail: cdemuth@hudson.org

jostle with other executive purposes. Abraham Lincoln's Executive Order 95 of 1863, the Emancipation Proclamation, would surely rate a gold star, as would George Washington's Thanksgiving Day Proclamation of 1789 (unnumbered). Dwight Eisenhower's school desegregation Executive Order 10730 of 1957, and Franklin Roosevelt's banking holiday Proclamation 2039 of 1933, might get honorable mention. I hereby nominate E.O. 6102 (FDR's 1933 confiscation of privately held gold coins), E.O. 10340 (Harry Truman's 1952 seizure of the steel mills), and E.O. 10998 (John Kennedy's 1962 authorization of public-employee collective bargaining) as the three rock-bottom worst. But I doubt that the National Archives – one of the least politicized agencies in Washington, standing tall and solid above the swamp – would want to enter this fray. It does have three established icons – the Declaration of Independence, the Constitution, and the Bill of Rights – and these days we should be content if it is able to maintain allegiance to them.

Tozzi's second proposal is that JFK's little known E.O. 11030 (1962), which provides that the drafting and vetting of executive orders be managed by OMB, should be amended to give OIRA (a division of OMB) a leading role in the process. This is an excellent idea. The issuance of executive orders has become rather *ad hoc* and chaotic in recent years, and increasingly controversial. The Department of Justice opines on the form and legality of draft orders, but that is inadequate. The things that presidents attempt to accomplish by executive order, often inspired by a passing contretemps or staff brainstorm, typically have a long and complicated history within the executive branch going well beyond matters of form and law, and also going well beyond the budget-oversight and related functions of OMB's other divisions. Tozzi wants to fortify OIRA's position within the executive branch, to help sustain its oversight of agency rulemaking, but his proposal makes sense on its own terms. Executive orders are mainly internal regulations – directions from the executive branch's principal to his far-flung agents – and regulation is OIRA's specialty.

Tozzi's first two institution-building proposals are warm-ups for his third, much more ambitious one: that the cost-benefit standard for individual rules be augmented or supplanted by a regulatory budget capping the total incremental costs of all new rules. (Budgets would presumably be set on an annual basis, and could be applied at the level of programs, agencies, or the executive branch as a whole.) He helpfully characterizes the two procedures as alternative means of addressing the principal-agent problem in government. Missionary regulatory agencies – single-mindedly devoted to promoting environmental quality, energy efficiency, safe and healthful products and workplaces, financial stability and fairness, nondiscrimination, and a host of other worthy causes – are empowered to command substantial private expenditures on behalf of their missions. These expenditures may be on the order of a hundred million dollars for a single rule, and in the aggregate are much greater than the agencies' own operating budgets, but they are subject to none of the

disciplines of public finance (taxation, appropriation, budgeting) that apply to the government's own operations and spending programs. Left to themselves, regulatory agencies will be inclined to order expenditures on their statutory missions that take insufficient account of competing claims and alternative uses of private resources; the agencies' principal, be it the President, the Congress, or the general public, will be inclined to take a more capacious, balanced view.

In Tozzi's formulation, cost-benefit analysis is an application of welfare economics and decision theory to the principal-agent problem, while regulatory budgeting is an application of institutional economics and optimal-delegation theory. The former were in vogue, in academic economics and government, in the 1970s when the White House review procedures were first established – but the latter are older (going back to a delicious passage in *The Wealth of Nations*) and better suited to the problem at hand, and have recently been enjoying a revival.

He points in particular to an important article by Yair Listokin, "Bounded Institutions."[1] In "unbounded institutions," agents make individual decisions according to rules or standards handed down by principals; in "bounded institutions," principals set a quantitative cap on agents' decisions. Each approach has advantages and disadvantages in different circumstances. The bounded approach tends to dominate where (*a*) agents decide among more numerous candidates for action (e.g., grant awards, regulatory interventions, student grades, legal prosecutions); (*b*) the range of quality among candidates is narrower; (*c*) principals have a better general idea of the number and average quality of candidates; and (*b*) agents are more biased, compared to the preferences of principals, in judging the quality of candidates.

Listokin's analysis suggests important advantages of a regulatory budget (bounded) over a cost-benefit standard (unbounded), especially in the context of an agency such as the Environmental Protection Agency (his example) with a strong missionary bias and numerous candidates for pollution controls of varying degrees of strictness. Under a cost-benefit standard, EPA will systematically overvalue the benefits of its rules; every rule that meets the standard will be issued, resulting in excessive pollution-control investments from a government-wide (or society-wide) perspective. Under a regulatory budget, individual rules compete not with the standard but with each other – EPA, notwithstanding its benefits bias, will issue rules with the highest net benefits until it reaches its cost budget.

But there are shortcomings as well, or at least challenges. A regulatory budget relies on estimates of private costs, which are much spongier and more open to manipulation than the hard dollar sums of a spending budget (but this is a problem for

---

1 124 Yale L.J. 336–395 (2014). Available at https://www.yalelawjournal.org/essay/bounded-institutions.

the cost-benefit standard too).[2] The principal – the regulatory budget-setter – may have a poor idea of the distribution of potential regulatory strategies and outcomes, and so may set a cost cap that is too high or too low to achieve the benefits it desires (so OIRA may be a better budget-setter than Congress, because it is more knowledgeable about regulatory strategies and outcomes – although Congress might acquire a serviceable grasp of them through a regular budget exercise responding to itemized proposals from the executive).

Tozzi notes that the idea of a regulatory budget was in circulation in academic and government circles in the late 1970s when the cost-benefit standard was adopted instead. Now that institutional economics is catching up with welfare economics, he thinks the time may be ripe for moving to a regulatory budget. The Trump Administration has begun to do so through E.O. 13771 (January 30, 2017) and subsequent OIRA directives. These have required agencies to rescind at least two existing rules for every new rule they issue and to hold the net costs of their actions to an annual cost budget – and have set budget caps of zero or negative incremental costs. Tozzi would build on these steps, and the initial experience with them, by issuing a proposed revised executive order for public notice and comment, and by encouraging new optimal-delegation research building on the existing literature. The notice-and-comment process, and accompanying public hearings, would, like similar agency procedures, have the not-incidental purpose of building a political constituency for OIRA and its work.

I have a somewhat different, but complementary, view of the history of White House regulatory oversight and the cost-benefit standard. It casts additional light on the question of institutional durability and the prospects for a fully realized regulatory budget.

The emergence of White House regulatory oversight in the 1970s, and its continuance through both liberal and conservative administrations, are not puzzling, and will surely continue. The 1970s was the decade of the rulemaking revolution, when the regulatory agencies were breaking out of the cocoon of narrow case-by-case adjudication and discovering the power of informal notice-and-comment rulemaking affecting entire economic sectors. And there were many more such agencies, with the establishment of EPA in 1970 and many other new agencies concerned with health, safety, consumer protection, nondiscrimination, and other matters.

---

2 The conundrums of cost estimation particular to regulatory budgeting are analyzed in Christopher C. DeMuth. 1980. "The Regulatory Budget," *Regulation*, 29–44. Available at https://www.cato.org/sites/cato.org/files/serials/files/regulation/1980/3/v4n2-6.pdf. For example, a budget limited to observable compliance expenditures creates perverse agency incentives, such as for banning a product or production technology rather than regulating its design or use; but progressively broader measures of opportunity cost introduce progressively greater problems of estimation error and manipulation.

Suddenly, numerous agencies throughout the executive branch were issuing rules with costs and benefits of tens and hundreds of millions of dollars, often accompanied by great political controversy. The controversies were reaching the White House; the president would be praised or blamed, usually both, for the rules and their consequences; the White House staff, and auxiliary staffs in the Executive Office of the President such as OMB and the Council of Economic Advisors, needed to be in the loop. They got there at first intermittently, during the Nixon, Ford, and Carter years, and then systematically beginning with Reagan. The White House will remain in the loop, in one form or another, for as long as the "administrative state" continues to be an important, powerful feature of our government.

That White House oversight began and continued in the form of a cost-benefit standard, as opposed to a regulatory budget or other apparatus, is more complicated. At the beginning, as Tozzi emphasizes, CEA economists were familiar with cost-benefit analysis from their academic work, and OMB officials knew of it through their work on defense and public works projects. But there was another initial appeal: it was not only a decision procedure but a reporting procedure. White House officials lead hectic lives, consumed by a flurry of incommensurate problems, close calls, and ambiguous situations that may or may not become crises. When they receive a complaint from a political supporter or lobby group or member of Congress, alerting them to a heretofore obscure regulatory proceeding and looming decision, they need a prompt, succinct summary of the issue and its magnitude. What is the agency trying to do? How much will it cost? What about these complaints – might the project be moderated or improved, or just abandoned? A 10-minute West Wing briefing is an informal, top-line cost-benefit analysis, augmented with distributional and political details. The cost-benefit standard fits these needs well. In contrast, a regulatory budget leaves most programmatic details and discretion at the agency level – that is one of its advantages in organization theory. But, standing alone, it misses the political-governmental requirement for actionable centralized information and occasional policy countermanding.

Another, deeper advantage has emerged over time. The cost-benefit standard is a constraint, but an *elastic* constraint, and is a procedure not only for guiding decisions but also for *justifying* decisions. It places broad limits on regulatory initiatives – decisively vindicating very good ones and scuttling very bad ones – and has done so in every administration. But it also leaves ample room for contestable and subjective assumptions on many matters, especially in estimating the costs of foregone opportunities, the benefits of non-traded public goods, and the consequences of very-low-frequency events and very-low-exposures to pollutants; and it is highly sensitive to financial assumptions concerning discount rates and costs of capital.

These protean qualities have permitted cost-benefit analysis to serve as a constraint during antiregulation Republican administrations and a propellant during

pro-regulation Democratic administrations. And they have facilitated OIRA's dual role as neutral economic overseer and activist policy overseer for the current president. In every administration, Democratic as well as Republican, OIRA has regularly disputed agency cost-benefit analyses and moderated agencies' tendencies to over-regulation. Also, in every administration, OIRA has regularly approved agency initiatives it thought were unjustified on the cost-benefit merits, following presidential priorities or acceding to congressional or other political pressures. In the extreme, it has approved frankly paternalistic rules such as energy-efficiency standards where the benefits are entirely personal – consisting of presumed better purchasing decisions involving no externalities, no market failures, and no health, safety, or environmental improvements at all – and where aggressive calculations of net benefits have then been deployed as public-relations tools.[3]

OIRA is, of course, criticized in the news and in academic journals for throttling beneficial rules and approving harmful ones. However, its conflicted institutional role as both economic and political overseer requires that it maintain case-by-case flexibility. A striking feature of the public pronouncements and writings of OIRA administrators, especially while in office, is that they downplay the importance of the cost-benefit standard and emphasize broader, hazier functions such as promoting regulatory transparency, democratic accountability, and inter-agency cooperation.

Would OIRA's position change if it were overseeing a regulatory budget? OMB's overseers of *expenditure* budgets do not need or want case-by-case flexibility – they are ministerially enforcing spending limits that the president and Congress have agreed to (with their input).

OIRA, as overseer of regulatory budgets, would be more like them – but probably not by much. The budget metric would still be estimates of private costs, not dollars residing in Treasury accounts, and these would entail OIRA-agency disagreements and negotiations, over methods as well as sums, both at budget-setting time and case-by-case during the year. OIRA oversight of agency estimates of regulatory benefits would, in theory, be dispensed with – but, in practice, not entirely, because regulatory costs and benefits are often conflated.[4] Moreover, the

---

3 See Gayer, Ted, and W. Kip Viscusi. 2013. "Overriding Consumer Preferences with Energy Regulations," *Journal of Regulatory Economics*, 43:248–264. Available at https://pdfs.semanticscholar.org/1c0b/c21ff5f260df3224f8a614026ead43b991a0.pdf.
4 For example, the Department of Agriculture's 2018 labeling requirements for bioengineered foods, mandated by Congress in 2016, were estimated to have annual compliance costs in the hundreds of millions of dollars, and health and environmental benefits of zero. But, the national rule preempted an even costlier labeling rule of the State of Vermont, which would have been followed nationally to a significant degree because of economies in manufacture and distribution. The preemption effect could have been counted as an economic benefit—or, just as reasonably, as entirely eliminating (and then some) the incremental compliance costs of the federal rule. See U.S. Department of Agriculture, Agricultural Marketing Service. 2018. "National Bioengineered Food Disclosure Standard," *Federal Register*,

need for centralized information, at least for major and politically controversial rules, would continue.

And, because major rules are almost always challenged in court, followed by lengthy and often unpredictable judicial review, there would be a need for many exceptions and continuous revisions to regulatory budgets. The accounting for the Trump Administration's prototype regulatory budget, and the agencies' adherence to its two-for-one rule and incremental-cost budget caps, have been heavily dominated by the agencies' revisions to a handful of energy, environmental, and financial rules issued late in the Obama Administration; these have been matters of keen White House interest, and the ultimate results and budget impacts will not be known for several years when the courts have had their say. Still, there seems to have been more attention to eliminating old rules (many of them minor but pestiferous) than in previous administrations.[5]

Although President Trump came to office with a strong animus against new regulation, he has, like his predecessors, come to use regulation for his own purposes in response to new political developments – for example, banning bump stocks that convert semi-automatic firearms into automatic firearms, and proposing to ban categories of vaping products. If he wins a second term, regulatory budgeting will become much more demanding all down the line, from the White House to OIRA to the agencies, and we shall see whether it was merely a first-term emergency brake or the beginning of a sustainable institution of executive government.

The regulatory budget is well worth pursuing for the long term. Even with its incorrigible measurement problems, and even with budget caps that may be highly political and detached from formal principal-agent optimization, it could produce better results than unbounded cost-benefit analysis. Along the way, it could permit some relaxation of centralized case-by-case reviews and the institutional conflicts they create for OIRA. But not their elimination: The activity of commandeering private resources for public ends by executive fiat will remain highly contentious and vigorously contested in the individual case, so that the particulars will often be as important to the principals (Congress as well as the president) as to the agents.

The achievable goal of the imperfect regulatory budget should be to improve the internal culture of the regulatory agency – to cause missionary regulators to realistically monitor the effectiveness of their stock of rules, to weigh them against the

---

83(245): 65,814, 65,869. Available at https://www.federalregister.gov/documents/2018/12/21/2018-27283/national-bioengineered-food-disclosure-standard.

5 Reporting on the regulatory budget is spotty, but see Bolen, Cheryl. 2019. "Deregulation Window Closing 17 Months Before Trump Term Ends," *Bloomberg Government*. Available at https://about.bgov.com/news/deregulation-window-closing-17-months-before-trump-term-ends; Dan, Goldbeck. 2019. "Crunch Time for the Regulatory Budget," *American Action Forum*. Available at https://www.americanactionforum.org/daily-dish/crunch-time-for-the-regulatory-budget.

prospective results of new rules, and to make choices that maximize net benefits at the margin. That could be as politically durable as the current program has been, but here there is a great unknown. Under the cost-benefit standard, the elasticity that has preserved the program through successive administrations has been backstage and politically shrouded – in the more-or-less constraining methods employed for judging and justifying individual rules. Under the regulatory budget, the elasticity is front-and-center – in the more-or-less constraining budget caps publicly established from year to year and administration to administration. Would a newly arrived left-progressive administration be prepared to blow the lid off the regulatory budget of its conservative predecessor – in effect announcing that it was about to levy billions or trillions of dollars in new taxes – or would it prefer to abolish the "antiregulation" budgeting procedure and focus instead on the great social benefits it was about to bestow? But I have put the question in loaded terms, and can imagine that budgeting would indeed survive, especially if it was as embedded as President Reagan's review program had become when President Clinton took office. An aggressive budget might assure the new president's supporters that he or she was indeed going to get tough with the corporations and special interests; or budgets might be set differentially for favored and disfavored regulatory programs; or the procedure might be used for reassurance – to advertise, and practice, financial discipline in the pursuit of costly progressive goals.

But policy scholars should not be guided by political speculation. They – including today's Jim Tozzis in the executive service – should stick to the intrinsic integrity and improvement of the institutions they study and administer. In this light, the greater political transparency of regulatory budgeting may be seen as a benefit, not a cost.

Reference

Tozzi, Jim. 2019. "Office of Information and Regulatory Affairs: Past, Present, and Future." *Journal of Benefit-Cost Analysis*, 11(1). doi:10.1017/bca.2019.26.

Sally Katzen

Cost-Benefit Analysis Without the B: How Rewriting OIRA's Past Threatens Its Future

Jim Tozzi has a wealth of knowledge and experience with cost-benefit analysis and centralized review of Executive Branch rulemaking. Mine is more limited, but nonetheless significant.[1] And while I may agree with much of what he says in his article "Office of Information and Regulatory Affairs: Past, Present and Future," (Tozzi, 2019) I do see things differently than he does in a number of respects.

Starting with the "Past," Tozzi begins with "The Significance of a Historical Perspective." That is a good place to start, although there are many other thoughtful, detailed, well-documented historical accounts of cost-benefit analysis in rulemaking and the development of centralized review by OIRA (Copeland, 2006; Revesz & Livermore, 2008, pp. 25–27; Hopkins, 2011; Tozzi, 2011). More importantly, what Tozzi now draws from all of the history is that Executive Order (EO) 12291 is not only the culmination of what came before it and the foundation of what followed it, but also is somehow still alive, still vibrant, still functioning, and that its continued existence is to be preserved by future administrations.

Yes, EO 12291 was very influential and extremely important. But it was also deeply flawed. While Tozzi says that EO 12866, signed by President Clinton in September 1993, was EO 12291s "bipartisan derivative," it was much more than that and came about because EO 12291 was, at that point, unsustainable (Elliot, 1994; Morrison, 1986). Critics "complained that OMB oversight was merely a front for deregulation, that the Reagan and later the Bush White House were hostile to regulation generally, and that they therefore used the institution of OMB oversight to stymie agencies' regulatory initiatives" (Croley, 2003, p. 826). Many suspected (or hoped) that President Clinton would rescind 12291, disband OIRA and, once again, leave the agencies to their own devices. (Katzen, 2018*a*).

The Clinton EO retained a requirement for economic analysis and centralized review. However, major changes were made, including those relating to selectivity (OIRA would review only significant regulations), transparency (from logging meetings with outsiders to reflecting changes during the review process), time frames

---

1 The author's experience includes serving as the General Counsel at the Council of Wage and Price Stability, which housed the unit that became the staff of OIRA, and then Administrator of OIRA.

Sally Katzen: Professor of Practice and Distinguished Scholar in Residence, New York University School of Law, 40 Washington Square South, New York, NY 10012, USA, e-mail: Sally.Katzen@nyu.edu

for review, and provisions for dispute resolution (Katzen, 2018*b*). These were not trivial or inconsequential changes but fundamental to the ultimate acceptance of centralized review in EO 12866. In addition, and contrary to Tozzi's statement that EO 12291 "did not overreach" and "never claimed to displace the authority of an agency to make the final call on the substance of a rule," the single most compelling complaint about EO 12291 was that the agency's substantive expertise was indeed displaced by the "black box" that characterized OIRA's review under EO 12291 – a draft notice of proposed rulemaking or draft final rule was sent to OIRA and might never be heard from again (Tozzi, 2019, p. 4). That is why EO 12866 reaffirms the "primacy of Federal agencies in the regulatory decision-making process" and gives "due regard to the discretion that has been entrusted to the Federal agencies" – that is, EO 12866 speaks twice to the relative expertise of the agencies in a single paragraph in the introduction to the Executive Order (Clinton, 1993).

We learned a lot from the implementation of EO 12291 – of things *not* to do – and incorporated those lessons in drafting EO 12866. That may be the reason why EO 12291 lasted only 12 years through two Republican Administrations, while EO 12866 has lasted over 25 years through both Republican and Democratic Administrations. To now claim that EO 12291 is somehow on a higher plane than other Executive Orders and consequently worthy of being resurrected and/or reinstated is not to learn from history but to ignore it.

Which brings me to Tozzi's suggested method of preserving EO 12291 – namely, to have the National Archives "classify a select number of [executive orders (including specifically 12291)] as 'Iconic' meaning that incoming administrations should accord them procedural and substantive deference prior to considering their revocation" (Tozzi, 2019, p. 5). With respect, I am dubious that would provide much protection from a president who disdains precedent and enjoys turning over apple carts. I am dubious it would provide much protection even from a more traditional president (Obama, 2009). Tozzi apparently recognized that the George W. Bush EO went beyond neutral process issues and dipped dangerously into partisan ideology in recasting certain provisions, such as those calling for formal rulemaking hearings and politicizing the appointment of regulatory policy officers (U.S. Congress, *Amending Executive Order 12866: Good Governance or Regulatory Usurpation?*, 2007, statement from Sally Katzen, pp. 52– 54). Executive Orders are selected vehicles for certain policy pronouncements because they become law with the stroke of a pen; so too, they can be nullified with the stroke of a pen. If a president does not like an Executive Order signed by one of his predecessors, it is highly unlikely that he or she would be deterred by an "Iconic" label.

The second section of Tozzi's paper relates to the "Present," and essentially invokes a Kennedy-era Executive Order as a vehicle for formalizing the involvement of OIRA in reviewing Executive Orders. While it is unclear if Tozzi wants OIRA to be at the table for *all* Executive Orders, including those relating to areas beyond its

ken, such as national security or personnel issues, it appears that he would probably restrict OIRA's involvement with respect to Executive Orders only to those relating to centralized review.

Based on my experience, it is not apparent why anything is needed here. When I was at OIRA, I was invited to participate in any Executive Order touching on any regulatory issue. If that is no longer the case, I do not see how reviving a Kennedy-era Executive Order would change the currently operative dynamics or intra-OMB relations.

Of course, if this is just another attempt to try to protect centralized review by constructing obstacles to any changes to the underlying EO (recognizing that Tozzi is focusing on 12291, I would substitute 12866), then that would be salutary but unlikely to hold much sway. As noted above, if this President or any president wants to do away with centralized review, an Executive Order inviting OIRA to the table is not going to dissuade him.

One point worth commenting on is Tozzi's suggestion that public comment on proposed changes to Executive Orders would be useful on occasion (Tozzi, 2019, p. 6). We found that public input was very useful in the drafting of EO 12866. Indeed, I often tell the story of multiple meetings with multiple groups reviewing multiple drafts (Katzen, 2018*b*). But those were confidential meetings discussing confidential drafts, not comments spread on the public record – in large part because when advocates make statements on the public record they are typically inclined to harden their position (or even grandstand) to preserve their options, rather than engaging in give and take to reach accommodation and resolve conflicts. Just a thought.

The bulk of Tozzi's paper relates to the "Future of OIRA," and much of that is taken up with justification and praise for a regulatory budget (and the "two for one" program) announced by President Trump in his first Executive Order on regulations (Trump, 2017). I admit that there is much in these pages that I cannot follow and therefore do not feel competent to comment on. But I was struck by two things.

First, it is surprising (and disconcerting) that in a paper for the Society of Benefit-Cost Analysis, Tozzi essentially relegates cost-benefit analysis to a secondary (or even irrelevant) consideration in favor of a regulatory budget. He accurately describes a regulatory budget as "a ceiling on the total incremental cost of complying with regulations that can be imposed on the regulated community by a regulator" (Tozzi, 2019, p. 16). So, with a regulatory budget, there is consideration of costs, but *no* consideration of benefits. This is consistent with the overall tenor of his discussion. Admittedly, at one point he suggests that benefits will likely continue to play a role in the process of selecting regulations to be discarded, saying:

> implicit in the [2 for 1] program is the political leadership's trust that the
> centralized review agency's career civil servants would only implement those

actions which maximize public welfare subject to the prevailing constraints (Tozzi, 2019, p. ~~13~~).

His optimism is, I believe, sadly misplaced. Based on the many proposed and final rules that OIRA has "cleared," either the career staff has not flagged the obvious deficiencies in the cost-benefit analyses or the political leadership has overruled them (Farber, 2019; Jacewicz & Revesz, 2019).

In any event, Tozzi is clearly unwilling to continue to rely on a cost-benefit test. He states:

> [E]ven if only those regulations whose benefits exceed their costs are promulgated, the majority of the benefits may not accrue to those paying the costs. Therefore, the nation is confronted with a potential shortage – at an exceedingly high opportunity cost – of capital to finance the totality of regulations whose benefits exceed their costs." (Tozzi, 2019, p. ~~8~~).

This is not a new argument against regulations; it is just not one that people focused on cost-benefit analysis usually make. For almost 40 years, the test has been to maximize net societal benefits, so that we, as a society, are better off with the regulations than without them. In many cases, the regulations are designed to counteract the fact that the regulated entities are not internalizing their own costs but rather are off-loading them on society (Helbling, 2018). The regulations are intended to reduce those externalities. Of course, the benefits do not accrue to them uniquely but rather to society as a whole (Office of Management and Budget, 2003, p. 14). And the statement that these costs are "hidden from public scrutiny" is somewhat bizarre, given the work that goes into the Regulatory Impact Analyses accompanying the proposed and final regulations and the publicity the cost numbers invariably receive from the opponents of the rules (Tozzi, 2019, p. ~~9~~).

After these seemingly dismissive references to benefits, Tozzi then praises the regulatory budget (and the 2-for-1 standard) for focusing on reducing costs (Tozzi, 2019~~, p. 12~~). On and on, we read about the high cost of regulations and the importance of controlling/reducing those costs. And he is clear that the steps taken by President Trump have significantly reduced the costs of regulations already: "The Trump regulatory budget is resulting in an unprecedented reduction in compliance costs" (Tozzi, 2019, p. ~~10~~). Reducing costs is obviously praiseworthy; regrettably, there are no further references to benefits, and whether society is less well off as a result of the modification or rescission of regulations in the name of decreasing costs.

The second point is one that Tozzi partially embraces – namely, that the setting of a ceiling on the cost of regulations is a job for the Congress, not the Executive (Tozzi, 2019~~, pp. 9, 10, 19~~). But while he concedes the point, he nonetheless continues to

advocate for the Executive to impose such a cap. Perhaps he does so because he thinks Congress' reticence is only because, in his words, there is no natural constituency for such a move (Tozzi, 2019, p. ~~19~~). Not so. A regulatory budget has its supporters, but it also has its opponents. It is in fact very controversial and not accepted on both sides of the aisle. While Tozzi repeatedly refers to the Carter Administration's support for a regulatory budget, it bears emphasis that such a proposal was not embraced by the Administration, was not introduced in Congress, and was obviously not enacted in law; it was a proposal, a discussion piece, an idea floated out there to see if anyone saluted. No one did (Sabin, 2016, p. 7). Most Democratic Members of Congress are deeply suspicious of or strongly resist the notion, in large part because it dispenses with any consideration of benefits – it is cost-benefit analysis without the B.

Consider me someone who continues to have faith in cost-benefit analysis and hopes that future presidents will return to that touchstone when they consider their regulatory approach.

References

Copeland, Curtis. 2006. "The Role of the Office of Information and Regulatory Affairs in Federal Rulemaking." *Fordham Urban Law Journal*, 33: 4.

Croley, Steven. 2003. "White House Review of Agency Rulemaking: An Empirical Investigation." *University of Chicago Law Review*, 70: 821–855.

Elliot, E. Donald. 1994. "TQM-Ing OMB: Or Why Regulatory Review under Executive Order 12,291 Works Poorly and What President Clinton Should Do about It." *Law and Contemporary Problems*, 57(2): 167–184.

Farber, Dan. 2019. "How Trump Officials Abuse Cost-Benefit Analysis to Attack Regulations." *Washington Monthly*, January 9, 2019. Available at https://washingtonmonthly.com/2019/01/09/how-the-trump-administration-abuses-cost-benefit-analysis-to-attack-regulations/. (accessed September 21, 2019).

Helbling, Thomas. 2018. "Externalities: Prices Do Not Capture All Costs." *Finance and Development*, June 1, 2018. Available at https://www.imf.org/external/pubs/ft/fandd/basics/38-externalities.htm. (accessed September 21, 2019).

Hopkins, Thomas D. 2011. "The Evolution of Regulatory Oversight – CWPS to OIRA." *Administrative Law Review* 63: 71–77.

Jacewicz, Natalie, and Richard Revesz. 2019. "EPA is Rolling Back Protections with Methodology No Respectable Economist Would Endorse." *The Hill*, March 4, 2019. Available at https://thehill.com/opinion/energy-environment/432471-epa-is-rolling-back-protections-with-methodology-no-respectable. (accessed September 21, 2019).

Katzen, Sally. 2018a. "Benefit-Cost Analysis Should Promote Rational Decisionmaking." *The Regulatory Review*. https://www.theregreview.org/2018/04/24/katzen-benefit-cost-analysis-promote-decisionmaking/. (accessed September 23, 2019).

Katzen, Sally. 2018b. "Tracing Executive Order 12866's Longevity to its Roots." George Washington Regulatory Studies Center. https://regulatorystudies.columbian.gwu.

edu/tracing-executive-order-12866%E2%80%99s-longevity-its-roots-katzen. (accessed September 20, 2019).

Morrison, Alan B. 1986. "OMB Interference with Agency Rulemaking: The Wrong Way to Write a Regulation." *Harvard Law Review*, 99: 1059–1074.

Office of Management and Budget. 2003. Circular A-4, Regulatory Analysis, September 17, 2003. Available at https://www.whitehouse.gov/sites/whitehouse.gov/files/omb/cir culars/A4/a-4.pdf. (accessed September 20, 2019).

President Barack Obama. 2009. "Executive Order 13497 of January 30, 2009, Revocation of Certain Executive Orders Concerning Regulatory Planning and Review." *Federal Register*, 74(22): 6113.

President Donald J. Trump. 2017. "Executive Order 13771 of January 30, 2017, Reducing Regulation and Controlling Regulatory Costs." *Federal Register*, 82(22): 9339.

President William J. Clinton. 1993 "Executive Order 12866 of September 30, 1993, Regulatory Planning and Review." *Federal Register*, 58(190): 51735.

Revesz, Richard, and Michael Livermore. 2008. *Retaking Rationality: How Cost-Benefit Analysis Can Better Protect the Environment and Our Health*. New York, NY: Oxford University Press.

Sabin, Paul. 2016. "'Everything has a price': Jimmy Carter and the Struggle for Balance in Federal Regulatory Policy." *Journal of Policy History*, 28:1.

Tozzi, Jim. 2011. "OIRA's Formative Years: The Historical Record of Centralized Regulatory Review Preceding OIRA's Founding." *Administrative Law Review*, 63: 37–69.

Tozzi, Jim. 2019. "Office of Information and Regulatory Affairs: Past, Present, and Future." *Journal of Benefit-Cost Analysis*, 11(1). doi:10.1017/bca.2019.26.

U.S. Congress House, Committee on the Judiciary, Subcommittee on Commercial and Administrative Law. 2007. *Amending Executive Order 12866: Good Governance or Regulatory Usurpation?* 110th Cong., 1st Session, February 13, 2007 (statement from Sally Katzen).

John D. Graham

A Future for Federal Regulatory Budgeting?

For decades, a strong case has been made for comprehensive reform of the U.S. federal government's regulatory processes (for early contributions, see Weidenbaum & DeFina, 1978; Lave, 1981; Breyer, 1982; Harrison & Portney, 1983; Litan & Nordhaus, 1983; Viscusi, 1992; Breyer, 1993; Sunstein, 1996; Graham, 1996, 1997). Establishment of centralized Office of Management and Budget (OMB) oversight through the Office of Information and Regulatory Affairs (OIRA) was an important achievement, but Congress has not yet passed comprehensive regulatory reform legislation.

Jim Tozzi has been a central player in the case for reform, based on his roles in the establishment of OMB's OIRA in the early 1980s and his subsequent leadership of the influential Center for Regulatory Effectiveness. Drawing from this wealth of experience, Tozzi has penned "Office of Information and Regulatory Affairs: Past, Present, and Future" (2019). I am honored to have been asked to comment on this thoughtful piece of scholarship.

Tozzi starts from the premise that a central problem with federal regulation is the uncontrolled growth of the cumulative costs of federal regulation. He emphasizes the need for a national regulatory budgeting system, one that is modeled after the standard budgetary processes for governmental appropriations. He envisions a regulatory budget that is determined each year by the Congress in collaboration with OMB and the agencies. Because an annual regulatory budget would cap regulatory costs (at each agency and in total), it is seen as a solution to the growth in cumulative regulatory costs.

Tozzi recognizes that the regulatory budgeting system imposed by the Trump administration via executive order does not enjoy broad bipartisan support. Most agencies have been assigned negative regulatory budgets, which – if implemented faithfully – requires a net reduction in regulatory costs at each agency each year. Many agencies are trying to deregulate, but the administration has a poor track record of defending deregulation in federal courts (Graham & Belton, 2019). Moreover, it is not obvious what happens if an agency fails to meet their negative cost cap, as apparently happened at some agencies in 2018. One also wonders why there is not any major agency that has made a persuasive case for a significant increase in

John D. Graham: Paul H O'Neill School of Public and Environmental Affairs, Indiana University, USA, e-mail: grahamjd@indiana.edu

their regulatory budget. Trump's system is also supplemented and confused by the "two-for-one" gimmick, a separate requirement that two regulations be rescinded for each new one that is adopted. The number of regulations per se is widely regarded as an unimportant metric for serious regulatory reform. For a variety of reasons, it seems unlikely that the Trump approach to regulatory budgeting will survive the Trump presidency (Belton *et al.*, 2017; Graham & Belton, 2019).

Tozzi argues that a more promising approach to regulatory budgeting was proposed (although not enacted) in the Jimmy Carter era. Indeed, it was never really proposed by the Carter administration, although it had bipartisan interest in Congress during Carter's term of office. The Carter-era approach would involve Congress as well as OMB and the agencies, and the approach need not be saddled with the "two-for-one" gimmick (my word) that symbolizes Trump's commitment to deregulation (Belton *et al.*, 2017; Graham & Belton, 2019).

Why impose a cost cap on agencies? When an agency's incremental regulatory costs are capped, the theory is that agencies will give priority to new regulatory initiatives that are affordable within the cap and have the highest societal return per dollar of imposed cost. The budgetary limitation will also provide each agency an incentive to do the tedious work of scrutinizing existing regulations and finding some that can be made less burdensome or more cost-effective, because those savings create room under the agency's cap for promising initiatives (Belton *et al.*, 2017). As long as the executive branch's total appropriations are constrained by Congress but total regulatory costs are unconstrained by Congress, an agency will have an incentive to shift program development from budgeted activities to off-budget activities like regulation. As a result, Congress is currently imposing no coherent constraint on the overall size of the federal government's influence on the economy, a role that OMB could play if Congress would enact regulatory budgeting. I agree with Tozzi's central point that regulatory budgeting, in order to have maximum impact and longevity, must be embraced and implemented by the Congress.

Whether Congress has any near-term interest in adopting a regulatory budget is certainly doubtful. The current bout of partisan polarization in Congress has stifled most legislative activity. More generally, the members of Congress may have an electoral incentive to grant broad regulatory authority to agencies without accepting any political accountability for the specific rules that are issued or the cumulative costs of the regulatory state. In the future, a window of opportunity for regulatory budgeting could arise if the Congress decides to consider ways to resolve the fiscal challenges facing the country.

There are, however, some weaknesses in the case for the regulatory budgeting. Those weaknesses need to be addressed in the academic literature and discussed in bipartisan forums. I am pleased that Tozzi acknowledges some of the weaknesses and calls for bipartisan deliberation. Here are some of the weaknesses that I believe need to be considered.

First, it is not obvious that a regulatory budgeting system will place much effective constraint on the cumulative cost of federal regulation. If Congress wishes to allow a large amount of growth in federal regulation, the budgetary limitations imposed on agencies can be set at very high, permissive levels, thereby facilitating continued growth in the cumulative costs of federal regulation. Congress can also exempt huge swaths of regulation from the budget, thereby reducing the effective discipline. In the appropriations process, Congress has demonstrated for decades a willingness to ignore fiscal discipline and allow federal spending and the overall size of the federal debt to balloon (Lee *et al.*, 2013). Proponents of regulatory budgeting need to explain why Congress would be any more disciplined with regulatory budgeting than they are with federal appropriations.

Second, the international experience with regulatory budgeting is not similar to the comprehensive regulatory budgeting discussed during the Carter era and favored by Tozzi. European systems of regulatory budgeting tend to focus exclusively on the "administrative" costs of regulation (e.g., paperwork burdens and "red tape"), which are typically a small share of the total costs of regulation. The largest share of regulatory costs, the compliance costs shouldered by industry, are typically ignored in European budgetary systems. Administrative costs are already addressed in the U.S. system, however imperfectly, by OMB-approval procedures under the Paperwork Reduction Act (PRA) of 1980. If administrative costs are the central concern (although I doubt this is the case in the United States), it may make more sense to modernize the PRA than to enact regulatory budgeting. The key point is that there is virtually no international experience with the comprehensive type of regulatory budgeting that Tozzi is favoring.

Third, the premise that the cumulative costs of the federal regulatory system are a problem – either for the performance of the U.S. economy or as a threat to human liberty – is not shared on a bipartisan basis as Tozzi presumes it is. Concerns about the cumulative cost of federal regulation are expressed primarily by fiscally conservative think tanks, some business groups and libertarians (e.g., see Weidenbaum & DeFina, 1978; Coffey *et al.*, 2016; Crain & Crain, 2014; Crews, 2017).

There is a strong, multi-decade literature, authored by scholars linked to both political parties, demonstrating regulatory inefficiency, where inefficiency is characterized by a somewhat chaotic mix of under-regulation and over-regulation (for early contributions, see Viscusi, 1992; Breyer, 1993; Graham, 1996, 1997; Sunstein, 2002*a*, *b*). Regulatory inefficiency seems to call for a stronger focus on benefit-cost analysis or cost-effectiveness analysis rather than regulatory budgeting per se. Proponents of regulatory budgeting need to make the case that the phenomenon of under-regulation will be solved – or at least not exacerbated – by budgeting, in order for budgeting to attract more bipartisan support. Alternatively, regulatory budgeting needs to be married with other reforms aimed at curing under-regulation.

Reactions to the Trump administration's deregulation agenda illustrate the dilemma. Strong concerns have been raised that the administration is so focused on deregulation that agency officials are ignoring the benefits of regulation and refusing to consider new regulations, even when they have a solid benefit-cost justification (Linn and Krupnick, 2017; Graham & Belton, 2019). Indeed, since the Trump administration has such little interest in new regulations (excepting campaign priorities such as restraints on immigration and trade), the administration's two-for-one and budgeting reforms have not created much incentive for agencies to repeal or streamline existing regulations that are ineffective or wasteful. A regulatory budgeting system would have much more impact on retrospective review of regulations at agencies in an administration that has substantial ambitions for new regulations but also recognizes the compelling need to modernize the existing stock of regulations (Belton *et al.*, 2017). Given how costly, sensitive, and time consuming it is to perform meaningful retrospective reviews, agencies will not engage in the activity unless they have a powerful incentive to do so.

Fourth, regulatory budgets are a weak instrument to control the capital costs of existing regulations, since capital costs are typically incurred soon after a regulation takes effect. For capital costs, there is no substitute for effective ex ante evaluation of regulatory proposals. Finally, there is a widespread misperception that regulatory budgeting focuses only on costs, and the benefits of regulation have no role in budgetary processes. The misperception is unfortunately espoused by a wide range of academic economists who have historically been reliable proponents of efforts to modernize federal regulation. Well-respected economists affiliated with Resources for the Future have espoused this view (e.g., see Krupnick, 2017).

I describe this as a misperception because (*a*) regulatory budgeting is modeled after appropriations processes and (*b*) benefits of federal programs, although they are not always framed in economic terms, play an important role in appropriations processes. In fact, when agencies make their case to OMB for including new spending in the President's annual budgetary request, OMB evaluates the strength of the evidence-base case for additional spending. This is a key responsibility of an OMB budget examiner, one of the most important posts in the federal career civil service! Those benefits may be framed as program effectiveness against statutory goals, progress against accepted performance metrics or other budgetary constructs, but appropriations processes are designed do consider what good a budgetary increase would accomplish. The OMB-agency budgeting process is surely not perfect, but no serious student of the appropriations process would claim that program benefits are ignored in the process.

My hypothesis is that professional economists are inclined to harbor this misperception about regulatory budgeting because they are generally mistrustful of the Trump administration (not an unreasonable sentiment) and/or because they have little knowledge of budgetary processes. The latter point requires a bit of elaboration.

Most academic economists who teach students in economics have little or no formal training in budgetary processes and little hands-on experience in governmental budgeting or public administration. For readers who are surprised about this observation, I encourage them to examine the common textbooks in public finance used in U.S. economics departments. Those textbooks are typically strong on topics such as public goods and externalities, welfare economics, social insurance and income maintenance, and tax analysis and revenue systems. They are typically sparse with regard to the practical aspects of how the budget of a government agency is determined and how a case is made for a budgetary increase (see, for example, the superb text authored by Rosen & Gayer, 2010). I am referring to public-administration processes that occur at the state and local levels of government, in the federal government and in governments around the world. There are superb textbooks in "public budgeting," but doctoral students in economics are not typically required to take coursework in budgeting (Lee *et al.*, 2013).

Even in the White House, I was struck – during my service as OIRA administrator to President George W Bush (2001-2006) – by how unevenly connected the White House Council of Economic Advisors (CEA) was to OMB's annual process of preparing the President's budgetary request of Congress. Indeed, I often felt that CEA played a greater advisory role in the OIRA-led regulatory side of OMB than on the budget side, and I deeply appreciated the assistance from CEA's members and staff in OIRA activities (Graham, 2007, 2008).

I am not arguing that standard budgetary processes incorporate cost-benefit analysis as defined by the field of welfare economics. I am arguing that evidence-based cases are used in budgetary processes, and the key evidence to support a budgetary increase is often related to what tangible societal gains the budgetary increase would facilitate for a program's effectiveness or performance (e.g., more poor children receiving dental care or more vulnerable senior citizens served by meals on wheels). This is the crucial consideration of "benefits" that OMB budget examiners look for, and public administration professionals are trained to look for this evidence and take it seriously, rather than simply assume that all government spending is beneficial or worthless. A regulatory budget would operate similarly except that agencies would typically frame benefits as the field of welfare economics recommends that they be framed unless cost-benefit analysis is not feasible.

Academic economists do have a point that a strong system of cost-benefit review of new and existing regulations reduces the need for a regulatory budgeting system. However, there are well-recognized weaknesses in the cost-benefit system currently monitored by OIRA at OMB, so it would be a mistake to think there is no need to consider complementary reforms that might provide more fiscal, analytic, and evidence-based discipline to federal rulemaking (for some nonbudgetary reforms worthy of consideration, see Breyer, 1993; Graham, 1997, 2008; Fischbeck & Farrow, 2001;

Harrington *et al.*, 2009; Sunstein, 2013, 2014; Graham & Broughel, 2014; Graham & Liu, 2014; Coglianese, 2017; Noe & Graham, 2019). Nonetheless, I believe that regulatory budgeting is one of a portfolio of reforms that has some promise, if it is embraced by Congress with bipartisan support. Unfortunately, the lack of widespread support for regulatory budgeting among academic economists is an important obstacle for proponents of regulatory budgeting.

In summary, Jim Tozzi has for decades been a determined promoter of a more analytical and transparent federal rulemaking process. I was pleased to see that he remains intellectually active in making the case for reform, as he has a wealth of valuable experience to bring to the table. I share his view that more work needs to be done to build bipartisan support for a legislative approach to regulatory budgeting.

References

Belton, Keith, KerryKrutilla, and John D.Graham. 2017. "Regulatory Reform in the Trump Era." *Public Administration Review*, 77(5): 643–644.

Breyer, Stephen. 1982. *Regulation and Its Reform.* Cambridge, MA: Harvard University Press.

Breyer, Stephen. 1993. *Breaking the Vicious Circle: Toward Effective Risk Regulation.* Cambridge, MA: Harvard University Press.

Coffey, Bentley, PatrickMcLaughlin, and PietroPeretto. 2016. The Cumulative Cost of Regulations. Working Paper. The Mercatus Center, April 26, 2016.

Coglianese, Cary. 2017. *Achieving Regulatory Excellence*. Washington, DC: Brookings Institution.

Crain, W. Mark, and Nicole V.Crain. 2014. The Cost of Federal Regulation to the US Economy, Manufacturing and Small Business. Report for the National Association of Manufacturers. Washington, DC. September 10, 2014.

Crews, Wayne. 2017. *Ten Thousand Commandments: An Annual Snapshot of the Federal Regulatory State*. Washington, DC: Competitive Enterprise Institute.

Fischbeck, Paul S., and R. ScottFarrow. 2001. *Improving Regulation: Cases in Environment, Health, and Safety*. Washington, DC: Resources for the Future.

Graham, John D.2008. "Saving Lives through Administrative Law and Economics." *University of Pennsylvania Law Review*, 157(2): 395–540.

Graham, John D.1996. "Making Sense of Risk: An Agenda for the Congress." In *Risks, Costs and Lives Saved: Getting Better Results from Regulation*, edited by HahnRobert, 183–207. New York, NY: Oxford University Press.

Graham, John D.1997. "Legislative Approaches to Achieving More Against Risk at Less Cost." *University of Chicago Legal Forum*, 1997: 13–56.

Graham, John D.2007 "The Evolving Regulatory Role of the US Office of Management and Budget." *Review of Environmental Economics and Policy*, 1(2): 171–191.

Graham, John D., and KeithBelton. 2019. "Trump's Deregulation Agenda: Is it Working?" *Administrative Law Review*, in press.

Graham, John D., and James W.Broughel. 2014. "Stealth Regulation: Addressing Agency Evasion of OIRA and the Administrative Procedure Act." *Harvard Journal of Law and Policy-Federalist Edition*, 1(1): 30–54.

Graham, John D., and Cory R.Liu. 2014. "Regulatory and Quasi-Regulatory Activity without OMB and Cost-Benefit Review." *Harvard Journal of Law and Public Policy*, 37(2): 425–445.

Harrington, Winston, LisaHeinzerling, and Richard DMorgenstern, eds. 2009. *Reforming Regulatory Impact Analysis*. Washington, DC: Resources for the Future.

Harrison, David, and Paul R.Portney. 1983. "Regulatory Reform in the Large and in the Small." In *Reforming Social Regulation: Alternative Public Policy Strategies*, edited by LeRoy Graymer, and Frederick Thompson, eds., 219–246. Beverley Hills, CA: Sage.

Krupnick, Alan. 2017. *Doubling Down on Trump's Two-for-One Regulatory Reform. Blog-Post*. Washington, DC: Resources for the Future.

Lave, Lester B.1981. *The Strategy of Social Regulation: Decision Frameworks for Policy*. Washington, DC: Brookings Institution.

Lee, Ronald D., Ronald W.Johnson, and Philip G.Joyce. 2013. *Public Budgeting Systems. Ninth Edition*. Burlington, MA: Jones-Bartlett.

Linn, Joshua, and AlanKrupnick. 2017. "Ninety-Six Regulatory Experts Express Concerns about Trump Administration Reforms." In *Resources*. Washington, DC: Resources for the Future. Resourcesmag.org

Litan, Robert E., and William D.Nordhaus. 1983. *Reforming Federal Regulation*. New Haven, CN: Yale University Press.

Noe, Paul, and John D.Graham. 2019. The Ascendancy of the Cost-Benefit State? Working Paper 19-20.

Rosen, Henry, and TedGayer. 2010. *Public Finance*. New York, NY: McGraw-Hill.

Sunstein, Cass. 1996. "Constitutional Moments and the Cost-Benefit State." *Stanford Law Review*, 48: 247.

Sunstein, Cass. 2002a. *Risk and Reason: Safety, Law, and the Environment*. New York, NY: Cambridge University Press.

Sunstein, Cass. 2002b. *The Cost-Benefit State: The Future of Regulatory Protection*. Washington, DC: American Bar Association.

Sunstein, Cass. 2013. *Simpler: The Future of Government*. New York, NY: Simon and Shuster.

Sunstein, Cass. 2014. *Valuing Life: Humanizing the Regulatory State*. Chicago, IL: University of Chicago Press.

Tozzi, Jim. 2019. "Office of Information and Regulatory Affairs: Past, Present, and Future." *Journal of Benefit-Cost Analysis*, 11(1). doi:10.1017/bca.2019.26

Viscusi, W. Kip. 1992. *Fatal Tradeoffs: Public and Private Responsibilities for Risk*. New York, NY: Oxford University Press.

Weidenbaum, Murray, and R.DeFina. 1978. *The Cost of Federal Regulation of Economic Activity*. Washington, DC: American Enterprise Institute.

Susan E. Dudley

Regulatory Oversight and Benefit-Cost Analysis: A Historical Perspective

The Office of Information and Regulatory Affairs (OIRA) in the Executive Office of the President coordinates the federal government's regulatory agenda, reviews executive branch agencies' draft regulations, and oversees government-wide information quality, peer review, privacy, and statistical policies. Remarkably, its regulatory oversight functions, and the benefit-cost framework underlying them, have not changed significantly through six very different presidential administrations. This article examines the evolution of executive regulatory oversight and analysis from the 1970s to today, exploring the reasons for its durability and whether the current imposition of a regulatory budget challenges the bipartisan nature of regulatory practice.

Regulatory oversight before OIRA

The number and reach of regulatory agencies increased dramatically in the early decades of the 20th century. But, the extensive scope of their authorities raised concerns about the constitutionality of Congress's apparent delegation of its Article I powers to a "fourth branch." In response to these concerns, Congress passed the Administrative Procedure Act in 1946 to balance the competing goals of bureaucratic expertise and legislative accountability (Shepherd, 1996). It required that regulations be grounded in statutory authority, that agencies seek public comment before issuing rules, and that final rules be based on an administrative record.

Most of the early regulatory agencies were established as independent commissions to avoid political influence (Humphrey's Executer v. United States 1935); they generally issued "economic regulations," which imposed maximum or minimum prices, quantity restrictions, and service parameters (Weidenbaum, 2004). Evidence that these agencies appeared to be "captured" by the industries they regulated (Stigler, 1971) led to bipartisan deregulatory efforts from all three branches of government (Derthick & Quirk, 1985).

While economic forms of regulation were declining in the 1970s and 1980s, a new type of "social" regulation – aimed at environmental, safety, and health concerns – began to emerge (Weidenbaum, 2004). Concerns that these new regulations and

Susan E. Dudley: The George Washington University Regulatory Studies Center, USA
E-mail: sdudley@gwu.edu

reporting requirements were overly burdensome led presidents, beginning with Richard Nixon, to take steps to exert some control over them.

President Richard Nixon initiated a "Quality of Life Review" (QLR) in 1971. It required agencies to submit for Office of Management and Budget (OMB) review agendas of upcoming regulatory actions and certain proposed and final rules before publication in the *Federal Register* (Schultz, 1971; Tozzi, 2011).

President Gerald Ford built on the QLR and issued E.O. 11821 (1974), which required agencies to develop an "inflation impact statement" for each major legislative or regulatory proposal. Pursuant to E.O. 11949, these later became "economic impact statements" (1977). He signed a bill establishing the Council on Wage and Price Stability (CWPS) to, among other things, "intervene and otherwise participate on its own behalf in rulemaking, ratemaking, licensing and other proceedings before any of the departments and agencies of the USA, in order to present its views as to the inflationary impact that might result from the possible outcomes of such proceedings" (Council on Wage and Price Stability Act Amendments of 1975 Pub. L. 94-78). The CWPS "regulatory review staff … operated as a relatively freewheeling analytical group that selectively and publicly critiqued regulatory proposals from a wide array of federal agencies" (Hopkins, 2011, p. 71).

President Jimmy Carter discontinued the QLR but retained the CWPS economists' role in filing comments on the public record of agency rulemakings. Carter's "program had three principal objectives: improved regulatory management, economic deregulation, and the adoption of less-intrusive regulatory techniques" (Eads & Fix, 1982, p. 135). His cabinet-level Regulatory Analysis Review Group served as an "expert regulatory 'watchdog'" (Fix & Eads, 1985, fn. 19) that reviewed the most important regulatory proposals with analytical support from the CWPS economists (Weidenbaum, 1997).

Carter's E.O. 12044 required agency heads to determine the need for a regulation, evaluate the direct and indirect effects of alternatives, and choose the least burdensome approach (1978). He signed the Regulatory Flexibility Act, focused on minimizing regulatory impacts on small entities (Regulatory Flexibility Act of 1980 Pub. L. 96-354), and the Paperwork Reduction Act (PRA), which established Office of Information and Regulatory Affairs (OIRA) in OMB to review and approve all new reporting requirements to minimize the burdens associated with the government's collection of information (Paperwork Reduction Act of 1980 Pub. L. 96-511).

OIRA 1981–2019

Soon after he took office in 1981, *President Ronald Reagan* issued E.O. 12291, giving OIRA a role in reviewing draft regulations to ensure their benefits exceeded

their costs (1981). He abolished the wage and price program and moved the group of CWPS economists responsible for filing comments on regulation to the newly created OIRA along with the OMB analysts who had reviewed regulations under Ford and Carter. The directors of the OMB and CWPS units became deputies to the OIRA administrator (Hopkins, 2011; Tozzi, 2011). The former budget staff were assigned to specific agencies and responsible for transactional reviews and the PRA, while the CWPS economists focused on economic efficiency and the quality of agencies' benefit-cost analysis (BCA).

President George H. W. Bush ("Bush 41"), who had served as Reagan's Vice President and director of his Task Force on Regulatory Relief, continued the policies and practices of the previous eight years. However, one of his chief regulatory advisors observed that "the Bush administration lost the deregulatory momentum of the Reagan years" largely due to "the relaxed commitment to oversight in the Executive Office of the President" (Gray, 1993, p. 31).

President Bill Clinton's election in 1993 stirred hope among critics of OIRA oversight and the net-benefits approach to regulation that he might abolish regulatory review (Katzen, 2018*a*). But, he did not act immediately to rescind the Reagan order. Instead, after several iterations and repeat consultations with various agencies and outside groups, President Clinton signed E.O. 12866 (1993) on September 30, 1993 (Katzen, 2018*b*). While the new order's rhetoric was softer than the Reagan order it replaced, it retained the key features of OIRA regulatory review and reinforced the focus on net benefits and the philosophy that regulations should be issued only if required by law or a "compelling public need" (1993, Sec.1.a)

President George W. Bush ("Bush 43") retained E.O. 12866 but, at least in some respects, his OIRA administrator implemented it more aggressively than his predecessors, for the first time returning draft regulations to agencies for reconsideration pursuant to Sec. 6(b)(3) and sending "prompt letters" that suggested priority actions agencies could take to improve their regulations. During the Bush 43 administration, OMB also issued Circular A-4 on Regulatory Analysis (OMB, 2003), as well as bulletins articulating good practices for guidance documents (OMB, 2007*a*), data quality (OMB, 2002), peer review (OMB, 2004), and principles for risk analysis (OMB, 2007*b*).

Upon taking office in 2009, *President Barack Obama* directed his agencies to develop recommendations for a new executive order (Obama, 2009), noting that OIRA oversight can serve to "ensure consistency with Presidential priorities, to coordinate regulatory policy, and to offer a dispassionate and analytical 'second opinion' on agency actions" (Obama, 2009). Two years later, he issued E.O. 13563, which explicitly reaffirmed E.O. 12866 and supplemented it to address technological developments since 1993 as well as periodic review of existing regulations and other issues (2011). President Obama's E.O. 13579 was significant in that it encouraged

independent regulatory agencies to comply with some of E.O. 13563's provisions, including retrospective review (2011).

President Donald J. Trump came to office in 2016 promising deregulation. His E.O. 13771 directed agencies to remove two regulations for every new one they issued, and to offset the costs of new regulations by removing or modifying existing rules (2017). While his emphasis on reducing regulatory costs departed from previous administrations' focus on net benefits, he retained the Clinton and Obama executive orders requiring decisions to be made on the basis regulatory benefits and costs. The relevance of a budget constraint overlaid on existing policies is discussed below.

The durability of OIRA's procedures and principles

Bruff argues that by the end of the Reagan administration, OIRA's review procedures had gone from having a "distinctly experimental flavor" to "tentative acceptance in the executive branch" (1989, p. 562). The fact that they have continued through the next five very different presidents (Bush 41, Clinton, Bush 43, Obama, and Trump) confers on them a rare bipartisan status (DeMuth, 2011; Kagan, 2001).

What accounts for the durability of OIRA's procedures and principles over the course of almost 40 years and six presidents? Procedurally, as Congress delegates lawmaking authority to an increasingly large and complex body of regulatory agencies, OIRA gives the democratically-elected president a vehicle to monitor, and exert some control over, agency actions. While presidents have increased the size of White House staffs over the years, OIRA – with its transparent procedures and staff of career regulatory experts – complements and supports those advisors.

OIRA coordinates interagency disputes on regulation, liaises with White House officials to ensure regulations are consistent with presidential policies, and reviews regulations through an analytical economic lens to provide a "dispassionate and analytical second opinion" (Obama, 2009) on agencies' actions.

Not only does OIRA review help ensure agency actions are accountable to the elected president, but OIRA itself is accountability to Congress and the public as well. Because the OIRA administrator is a Senate-confirmed position, Congress can compel him or her to testify – something it cannot demand of White House staff. OIRA's disclosure procedures also provide Congress and the public information on meetings with outside groups on regulations under development.

Equally important are the policies expressed in E.O. 12866, E.O. 13563, and E.O. 12291 before them, which have become well-established regulatory practice (see, for example, OECD, 2008). Although BCA is still not universally supported (Ackerman & Heinzerling, 2004), it is increasingly accepted across the ideological spectrum as a valuable tool for informing policymaking (Revesz & Livermore, 2008;

Sunstein, 2017). While Congress has not adopted BCA and many statutes are silent on whether it governs regulatory decisions, the Supreme Court is increasingly interpreting silent statutes in favor of analysis (Graham & Noe, 2016; Entergy Corp. v. Riverkeeper, Inc. 2009; Michigan v. EPA 2015).

Role for a regulatory budget

In a world with perfect information and incentives that align with public goals, BCA alone would lead agencies to issue regulations only when they can show they make the public better off. In this ideal world, a budget constraint, such as that imposed by Trump's E.O. 13771, would be nonbinding or harmful because it would prohibit regulations that could have offered net societal benefits (Pierce, 2016).

In practice, of course, agencies' analyses are based on neither complete information nor publicly-aligned incentives (Dudley & Mannix, 2018). Regulators may seek to maximize their authority rather than social welfare or respond to the preferences of concentrated interests at the expense of the more diffuse public interest. In conducting analysis, they face incentives to show that the benefits of their desired actions outweigh the costs. As a counterweight to these political and institutional incentives that can lead to overregulation, Gayer *et al.* (2017) point out that a regulatory budget constraint may not be as anathema as it appears on the surface. When considered as a supplement to BCA requirements, it may motivate agencies to maximize benefits within a budget constraint (Dudley, 2016). Equally important, it may provide agencies with incentives to focus more attention on identifying existing regulations that may be underperforming.

Ever since Carter's E.O. 12044, presidents have directed agencies to examine the benefits and costs of existing rules (Aldy, 2014). These directives have had limited success because agencies lacked incentives to follow through, and faced analytical difficulties in measuring *ex-post* impacts (Dudley & Mannix, 2018). Trump's requirement that agencies offset the costs of new regulations by reducing the costs of existing regulations (through modification or rescission) may provide needed incentives. If taken seriously, it could also spur the development of improved analytical tools for evaluating regulatory benefits and costs. Not only could this address the problem of regulatory accumulation, but also it could improve *ex ante* BCA by testing, and providing valuable feedback on, the assumptions used initially.

As President Carter's Economic Report of the President concluded in 1980:

> Priorities must be set to make certain that the first problems addressed are those in which regulations are likely to bring the greatest social benefits. Admittedly, this is an ideal that can never be perfectly realized, but tools like the regulatory budget may have to be developed if it is to be approached (Carter, 1980, p. 26).

Conclusions

Since the emergence of the first social regulatory agencies in the 1970s, presidents have worked to supervise their regulatory policies and required them to show that new regulations will offer net public benefits. However, as Justice Elena Kagan observed, presidents confront a principle-agent problem; "In a world of extraordinary administrative complexity and near-incalculable presidential responsibilities, no President can hope (even with the assistance of close aides) to monitor the agencies so closely as to substitute all his preferences for those of the bureaucracy" (Kagan, 2001). Since 1981, presidents have relied on OIRA to monitor regulatory agency actions, coordinate information, perspectives, and policies across the executive branch, and provide a "dispassionate and analytical 'second opinion'" on agencies' analysis (Obama, 2009).

The bipartisan support for OIRA across six very different presidents is remarkable. While executive orders can be rescinded with the stroke of a pen, E.O. 12866 remains in effect 26 years after it was issued. (See Forum Celebrating 25 Years of Executive Order 12866: https://regulatorystudies.columbian.gwu.edu/node/916.)

This longevity can be attributed to the principles and procedures that guide OIRA review. Like its CWPS predecessor in earlier administrations, OIRA review applies BCA to improve the economic efficiency of government policies. Most observers agree that its review has motivated agencies to consider the effects of regulations, perhaps leading to "smarter regulations" that yield more benefits than costs (Graham *et al.*, 2006; Sunstein, 2011). Nevertheless, OIRA review and *ex ante* BCA have been inadequate for stemming the accumulation of regulation (DeMuth, 2011; Mandel & Carew, 2013).

Trump's regulatory budget has introduced the biggest shift in regulatory oversight and analysis since OIRA was formed. Significantly, he has not abandoned his predecessors' executive orders nor their BCA approach to regulation but rather has overlaid an incremental regulatory cost cap on top of it. Like previous attempts at constraining regulatory agencies, his has been controversial (Dudley, 2019). Yet, it may provide a useful counterweight to regulators' institutional tendency toward over-regulation (Gayer *et al.*, 2017) and could improve regulatory BCA in the long run.

References

Ackerman, Frank, and Lisa Heinzerling. 2004. *Priceless: On Knowing the Price of Everything and the Value of Nothing*. New York, NY: New Press.

Aldy, Joseph Edgar. 2014. Learning from Experience: An Assessment of the Retrospective Reviews of Agency Rules and the Evidence for Improving the Design and Implementation of Regulatory Policy. Administrative Conference of the United States. Available at http://www.hks.harvard.edu/fs/jaldy/img/aldy_retrospective.pdf. (accessed September 26, 2019).

Bruff, Harold. 1989. "Presidential Management of Agency Rulemaking." *The George Washington Law Review*, 57(3): 552–562.

Carter, Jimmy. 1980. Economic Report of the President. Available at https://www.presidency.ucsb.edu/sites/default/files/books/presidential-documents-archive-guidebook/the-economic-report-of-the-president-truman-1947-obama-2017/1980.pdf. (accessed September 26, 2019).

Demuth, Christopher. 2011. "OIRA at Thirty." *Administrative Law Review*, 63(Jan): 15–25.

Derthick, Martha, and Paul J. Quirk. 1985. *The Politics of Deregulation*. Washington, DC: Brookings Institution.

Dudley, Susan E. 2016. "Can Fiscal Budget Concepts Improve Regulation?" *New York University Journal of Legislation and Public Policy*, 19(2): 259–280.

Dudley, Susan. 2019. "A Brief History of Regulation and Deregulation." *The Regulatory Review*. Available at https://www.theregreview.org/2019/03/11/dudley-brief-history-regulation-deregulation/. (accessed September 21, 2019).

Dudley, Susan E., and Brian F. Mannix. 2018. "Improving Regulatory Benefit-Cost Analysis." *The Journal of Law & Politics*, 34(1): 1–20.

Eads, George C., and Michael Fix. 1982. "Regulatory Policy." In *The Reagan Experiment: An Examination of Economic and Social Policies Under the Reagan Administration*, edited by John L. Palmer, and Isabel V. Sawhill. Washington, DC*:* Urban Institute.

E.O. 11821. 1974. Executive Order 11821 of November 29, 1974, Inflation Impact Statements.

E.O. 11949. 1977. Executive Order 11949 of January 5, 1977, Economic Impact Statements.

E.O. 12044. 1978. Executive Order 12044 of March 23, 1978, Improving Government Regulation.

E.O. 12291. 1981. Executive Order 12291 of February 17, 1981, Federal Regulation.

E.O. 12866. 1993. "Executive Order 12866 of September 30, 1993, Regulatory Planning and Review".

E.O. 13563. 2011. Executive Order 13563 of January 18, 2011, Improving Regulation an Regulatory Review.

E.O. 13579. 2011. Executive Order 13579 of July 11, 2011, Regulation and Independent Regulatory Agencies.

E.O. 13771. 2017. "Executive Order 13771 of January 30, 2017, Reducing Regulation and Controlling Regulatory Costs".

Fix, Michael, and George C. Eads. 1985. "The Prospects for Regulatory Reform: The Legacy of Reagan's First Term." *Yale Journal on Regulation*, 2(2): 293–318.

Gayer, Ted, Robert Litan, and Phillip Wallach. 2017. "Evaluating the Trump Administration's Regulatory Reform Program." Series on Regulatory Process and Perspective. Brookings Center on Regulation and Markets. Available at https://www.brookings.edu/research/evaluating-the-trump-administrations-regulatory-reform-program/. (accessed September 26, 2019).

Graham, John D., and Paul R. Noe. 2016. "A Paradigm Shift in the Cost-Benefit State." *The Regulatory Review.* Available at https://www.theregreview.org/2016/04/26/graham-noe-shift-in-the-cost-benefit-state/ (accessed September 26, 2019).

Graham, John D., Elizabeth L. Branch, and Paul R. Noe. 2006. "Managing the Regulatory State: The Experience of the Bush Administration." *Fordham Urban Law Journal*, 33(4): 953–1002.

Gray, C. Boyden. 1993. "Lessons. (Bush Administration Regulatory Activities) (Reflections on the Bush Regulatory Record)." *Regulation*, 16(3): 4.

Hopkins, Thomas D. 2011. "The Evolution of Regulatory Oversight-CWPS to OIRA." *Administrative Law Review*, 63: 71–77.

Kagan, Elena. 2001. "Presidential Administration." *Harvard Law Review*, 114: 8.

Katzen, Sally. 2018a. "Benefit-Cost Analysis Should Promote Rational Decision Making." *The Regulatory Review.* Available at https://www.theregreview.org/2018/04/24/katzen-benefit-cost-analysis-promote-decisionmaking/. (accessed September 21, 2019).

Katzen, Sally. 2018b. "Tracing Executive Order 12866's Longevity to Its Roots." Regulatory Studies Center. Available at https://regulatorystudies.columbian.gwu.edu/tracing-executive-order-12866's-longevity-its-roots-katzen. (accessed September 21, 2019).

Mandel, Michael, and Diana Carew. 2013. Regulatory Improvement Commission: A Politically-Viable Approach to U.S. Regulatory Reform. Progressive Policy Institute.

OECD. 2008. Introductory Handbook for Undertaking Regulatory Impact Analysis (RIA). Organisation for Economic Co-operation and Development.

Obama, Barack H. 2009. *Regulatory Review* [Memorandum]. Available at https://obamawhitehouse.archives.gov/sites/default/files/omb/assets/information_and_regulatory_affairs/regulatory_review_012009.pdf. (accessed September 26, 2019).

OMB. 2002. *Guidelines for Ensuring and Maximizing the Quality, Objectivity, Utility, and Integrity of Information Disseminated by Federal Agencies* [Memorandum], 67 Fed. Reg. 8452 (February 22, 2002). Available at https://www.whitehouse.gov/sites/whitehouse.gov/files/omb/assets/OMB/fedreg/reproducible2.pdf. (accessed September 26, 2019).

OMB. 2003. *Regulatory Analysis.* OMB Circular A-4 [Memorandum] (September 17, 2003).

OMB. 2004. *M-05-03,* Issuance of OMB's "Final Information Quality Bulletin for Peer Review [Memorandum]. Available at https://www.whitehouse.gov/sites/whitehouse.gov/files/omb/memoranda/2005/m05-03.pdf. (accessed September 26, 2019).

OMB. 2007a. *Final Bulletin for Agency Good Guidance Practices* [Memorandum]. 72 Fed. Reg. 3432, 3440 (January 25, 2007).

OMB. 2007b. *M-07-24, Updated Principles for Risk Analysis* [Memorandum]. Available at https://www.whitehouse.gov/sites/whitehouse.gov/files/omb/memoranda/2007/m07-24.pdf. (accessed September 26, 2019).

Pierce, Richard J., Jr. 2016. "The Regulatory Budget Debate." *New York University Journal of Legislation and Public Policy*, 19(2): 249–258.

Revesz, Richard L., and Michael A. Livermore. 2008. *Retaking Rationality: How Cost-Benefit Analysis Can Better Protect the Environment and Our Health Oxford.* Oxford, UK: Oxford University Press.

Schultz, George. 1971. *Agency regulations, standards, and guidelines pertaining to environmental quality, consumer protection, and occupational and public health and safety* [Memorandum]. (October 5, 1971).

Shepherd, George. 1996 "Fierce Compromise: The Administrative Procedure Act Emerges From New Deal Politics." *Northwestern University Law Review*, 90(4): 27.

Stigler, George J. 1971. "The Theory of Economic Regulation." *The Bell Journal of Economics and Management Science*, 2(1): 3–21.

Sunstein, Cass R. 2011. "Smarter Regulation: Remarks from Cass Sunstein, Administrator, Office of Information and Regulatory Affairs." *Administrative Law Review*, 63(Jan: 7–13).

Sunstein, Cass R. 2017. "Cost-Benefit Analysis and Arbitrariness Review." *Harvard Environmental Law Review*, 41(1): 1–41.

Tozzi, Jim. 2011. "OIRA'S Formative Years: The Historical Record of Centralized Regulatory Review Preceding OIRA'S Founding." *Administrative Law Review*, 63: 37–69.

Weidenbaum, Murray. 1997. "Regulatory Process Reform: From Ford to Clinton." *Regulation*, 11(Jan): 20–26.

Weidenbaum, Murray. 2004. *Business and Government in the Global Marketplace*, 7th ed. Upper Saddle River, NJ: Pearson/Prentice Hall.

Cases Cited

Humphrey's Executor v. United States, 295 U.S. 602, 625 (1935).

Entergy Corp. v. Riverkeeper, Inc., 556 U.S. 208 (2009).

Michigan v. Envtl. Prot. Agency, 576 U.S. ___ (2015).

Sierra Club v. Costle. 657 F.2d 298 15 ERC 2137, 211 U.S.App.D.C. 336, 11; Envtl. L. Rep. 20,455 1981.

Laws Cited

Council on Wage and Price Stability Act of 1974, Pub. L. No. 93-387. (1974).

Council on Wage and Price Stability Act Amendments of 1975, Pub. L. No. 94-78 (1975).

Regulatory Flexibility Act of 1980 Pub. L. No. 96-354 (1980).

Paperwork Reduction Act of 1980 Pub. L. No. 96-511, 94 (1980).

Paperwork Reduction Act of 1980, 44 U.S.C. §§ 3501-3520 (1982).

Howard Shelanski

What Makes OIRA Work: A Commentary on Jim Tozzi's "Office of Information and Regulatory Affairs: Past, Present, and Future"

Jim Tozzi has for several decades been among the most dedicated and perceptive commentators on the White House Office of Information and Regulatory Affairs (OIRA). Indeed, Tozzi is arguably better suited than anyone to be the keeper of the OIRA flame: from his position in charge of the Office of Regulatory and Information Policy, OIRA's predecessor organization, Tozzi contributed to the development of Executive Order (EO) 12291 and then stepped in as OIRA's first Deputy Administrator. Since that time, he has been a steadfast defender of OIRA's critical role in bringing rigorous analysis, quality control, and policy discipline to Executive Branch regulation. I share Tozzi's view, and indeed that of all former OIRA officials I have spoken with, of OIRA's importance to the regulatory state. Preservation of the strength and independence of the office is to me the principal criterion by which policy proposals that effect OIRA should be judged.

In his new article, "Office of Information and Regulatory Affairs: Past, Present, and Future," Tozzi (2019) intertwines an enlightening history of the office with three policy proposals. First, Tozzi argues that there should be a class of EOs designated as "iconic," to which subsequent administrations should give substantial deference. He argues persuasively that EO 12866, President Clinton's successor to 12291 that to this day governs much of OIRA's activity, should be so designated. Second, Tozzi proposes a new EO that would give OIRA authority to review, in advance of presidential signing, any EO that has regulatory consequences. Tozzi's third proposal is that OIRA oversee implementation of an EO that imposes a "regulatory budget" to constrain the size of the administrative state. I agree with some of Tozzi's ideas but have questions about aspects of his proposals that might, unintendedly, work against the criterion of preserving OIRA's strength and independence in the future.

As a starting point, it is important to recognize that, regardless of what EOs might govern and empower OIRA, the institutional positioning of the office within an administration will be as important, if not more so, to OIRA's effectiveness. An OIRA with substantial powers on paper will do little to improve regulatory outcomes if the office can be ignored within the Executive Office of the President or bypassed by Departments and agencies. EO 12866 might indeed have a history and purpose that make it "iconic" but, unless the OIRA Administrator and the mission of the office

Howard Shelanski: Georgetown Law, Georgetown University, Washington DC, USA,
e-mail: howard.shelanski@davispolk.com

have strong backing from the White House, political expediency and agency ambitions will erode the regulatory quality control that OIRA is set up to exercise. For EO 12866 to be accorded particular deference and importance from administration to administration, it is important that the order be closely associated with an effective process that produces better regulation. For OIRA to achieve that goal, I think three things are essential: (i) a reporting relationship for the OIRA Administrator that includes direct communication with the Chief of Staff's office, (ii) a clear mandate from the Chief of Staff to executive departments and agencies that elevation of disagreements with OIRA to the Office of Management and Budget Director or senior West Wing officials should be a last resort, and (iii) inclusion of OIRA in any process or meeting to resolve any disagreements a Secretary or senior agency official does elevate.

It is important to clarify that the foregoing comment about institutional position does not mean that OIRA must always win or have the last word. In my experience as OIRA Administrator from 2013 to 2017, the three institutional features listed above ensured serious engagement with OIRA by executive branch departments and agencies, established a presumption against attempts to bypass OIRA in the event of disagreements, and made sure that OIRA's views were fully considered when serious disagreements arose. The result was that most issues got resolved between OIRA and the regulatory agencies and, for those that did not, the discussion among senior officials to resolve disputes were anchored in the principles established by EO 12866 and related EOs, as well relevant OMB circulars. Of the issues that did elevate during my tenure, OIRA won some and lost some. However, the losses always occurred with full airing of OIRA's concerns and a good faith effort through the process to adhere to core principles of careful analysis, use of best available science and economics, and ensuring that the regulation's benefits justified its costs.

Coming back to Tozzi's proposal for elevating the status of EO 12866, I agree that the order is deserving of particular deference and preservation by future administrations. However, I think the likelihood of achieving that deference will be greater if there is also some mechanism for ensuring that OIRA's role cannot be ignored, compromised, or bypassed; only in that case can EO 12866 have its greatest impact. I would therefore recommend supplementing Tozzi's idea with an additional proposal: an EO establishing the process of engagement and dispute resolution with OIRA that will ensure OIRA's strong and central role in regulatory quality control even when agencies challenge the office's recommendations or conclusions. An alternative way to achieve the objectives of such an EO, as well as Tozzi's goals of preserving EO 12866, is for Congress to further codify OIRA's role and underlying EOs. Congress has in recent years considered such legislation, and any codification of EO 12866 and other relevant documents has pros and cons. Although a discussion of those pros and cons is beyond the scope of this commentary, the topic is an important one and it would be interesting to hear Tozzi's view on the question of codification.

Tozzi's second proposal is that OIRA's role be expanded to reviewing any proposed EO, before the President issues it, which relates to regulation. As a practical matter, there is already some circulation and review of draft EOs to relevant stakeholders in the administration. However, I agree with Tozzi that it would be beneficial for OIRA to have a more formal and prominent role in EOs that relate in any way to rulemaking by executive branch agencies. It seems unlikely that the White House issued any of the prominent recent orders on regulation, like EO 13771 and EO 13777, without substantial input from OIRA. To the extent OIRA can have a more central role not just in orders that affect how OIRA itself operates, but in orders that have regulatory implications more broadly, that strikes me as a constructive development. OIRA is in a particularly good position to identify any inconsistencies with prior EOs or sound regulatory practices and to identify beneficial changes that an EO could introduce into the regulatory process.

My principal reservations relate Tozzi's third proposal, which is that OIRA have the mandate, and greater authority, to enforce a "regulatory budget." I do not disagree with the importance of regulatory discipline. Rules can easily accumulate, conflict with each other, and saddle particular industries with unnecessary burdens. To prevent such results, it is important to have a regulatory process that: (i) produces individual rules that efficiently achieve benefits that justify their costs; (ii) makes sure those rules do not conflict with existing rules; and (iii) reviews the stock of rules to ensure that, even if benefits outweigh costs on a rule-by-rule basis, rules do not accumulate on particular stakeholders or sectors in a way that flips that calculus. There are a number of ways to achieve these objectives. One option, which Tozzi proposes, is to have a regulatory budget that places a limit on rulemaking activity, for example by capping the total regulatory costs or the number of rules imposed by a given agency. An alternative but not mutually exclusive approach is to engage in ongoing retrospective review of rules already on the books. A third option, also not mutually exclusive of the other two, is to require agencies to account not only for the incremental costs and benefits of a new rule, but also for whether the cumulative costs of regulations on a particular set of actors remains justified by the cumulative benefits. To Tozzi's credit, he devotes substantial discussion in his paper to the complexities of a regulatory budget and the alternative institutional approaches to achieving a limit on regulatory expenditures. In the end, however, he advocates an administrative solution through an EO that places OIRA in the central role of implementing and enforcing an overall cap on regulatory costs.

As the third part of Tozzi's article suggests, all of the foregoing approaches and regulatory process objectives are subject to debate. They all have pros and cons and entail distinct tradeoffs. One important dimension in which the alternative approaches differ is in how well OIRA can implement them, and here is where I have a concern with Tozzi's reliance on the office, and on EO authority, to enforce a regulatory budget. Enforcement of regulatory budgets ultimately requires tradeoffs on the margin among alternative social benefits. Even if one accepts the

premise that a regulatory budget is a good idea (a premise that warrants discussion), it is an extremely difficult exercise to determine which rules should be allowed and which should be removed to remain within the budget constraint, however defined.

A proposed new regulation might have the same costs but much different benefits than some existing regulation. If the new rule's incremental costs would push cumulative regulatory expenditures above the budget constraint, what should happen? Should the new rule be blocked or should an existing rule be repealed? Optimally, the rule with the lower benefits should be discarded. However, to the extent the benefits of these respective hypothetical rules accrue to different stakeholders, or are difficult to quantify, any decision about which rule to allow and which to block will entail an important policy—and political—decision. Although OIRA might, in principle, be in a position to assess when cumulative regulatory costs have exceeded some level, I think the office is less well positioned to enforce tradeoffs among rules. To the extent that OIRA's principal mechanism for enforcing a regulatory budget constraint would be to refuse to accept a budget-busting rule for review, OIRA would effectively be delaying the benefits of the new rule in favor of the benefits (even if lower) of incumbent rules. To be sure, it might be possible for OIRA to put a particular agency on notice that its regulatory costs were running up against a constraint, so that the agency would know that it should simultaneously propose a rule to repeal to offset the new rule being proposed. But if either the benefits or the costs of the rule to be repealed accrue to different stakeholders than those affected by the new rule, OIRA could be seen to be picking winners and losers from the regulatory process. Such an outcome could create the perception that OIRA is making substantive policy tradeoffs for which it can claim neither expertise nor political or statutory legitimacy. The inevitable criticisms from stakeholders and regulatory agencies, and the increased politicization of OIRA that would likely result, could do more to weaken than to strengthen the office.

I therefore think that, even were Congress or the President to impose a regulatory budget of some kind, OIRA's role should be limited to publicly reporting on when that budgetary constraint is being approached or exceeded. Putting OIRA in the further role of enforcing the constraint is a much riskier proposition; such an enforcement role is practically and politically better left elsewhere, most likely with Congress.

That said, I think OIRA nonetheless has a very important role in enforcing regulatory discipline. I return to two other approaches mentioned above: requiring agencies to engage in retrospective review of regulations on the books, and requiring agencies to identify not just incremental costs and benefits of rules, but cumulative burdens and benefits on affected stakeholders. Both of these approaches have practical and conceptual challenges. Identifying those rules on the books whose repeal would yield net benefits is analytically difficult, and the constituency for repeal might be quite weak. Calculating cumulative costs on a particular economic segment might not be straightforward, as some costs should arguable not count toward a cap (e.g., those

a regulated firm incurs to avoid causing harmful externalities) while other costs more arguably should count toward a cap (costs of correcting for harms the regulated firm did not directly cause). But these difficulties aside, both retrospective review and requiring agencies to account for accumulated effects on parties affected by a new rule are more consistent with OIRA's historic role and expertise, and is more reliant on the kinds of analysis OIRA typically conducts. Whereas Tozzi puts significant emphasis going forward on EO 13771, the 2017 "one in, two out" order, I would instead put more emphasis implementing EO 13777, the 2017 order further mandating and institution-alizing retrospective review, modification, and repeal of existing regulations.

OIRA had in fact made significant progress toward institutionalizing retrospective review of existing regulations even before EO 13771. President Obama made retro-spective review a priority, and beginning in 2011, all executive branch Departments filed regular reports to OIRA on their plans for rules to review and on their progress in completing reviews of rules listed in previous plans. By the middle of 2016, OIRA was able to report that the resulting repeal and modification of rules to that point would already generate cost savings of $37 billion over 5 years.[1] That result came from significant engagement by agencies and departments in establishing internal processes and assigning staff accountable for achieving beneficial outcomes from regulatory review. Those steps were, to be sure, just a beginning, and EO 13777 is well designed to implement yet further progress in retrospective review going forward.

Although one can debate alternative ways for OIRA to achieve good regulatory outcomes—and reasonable minds can certainly differ on what outcomes count as "good"—OIRA plays and in the future should continue to play a critical role in bringing rigor and quality to federal rulemaking. To that end, Jim Tozzi has written a thought provoking article on how to preserve, strengthen, and extend OIRA's role in the administration of the regulatory state. I agree in all respects with Tozzi's view of OIRA's importance and in his objectives of ensuring the office remains independent and effective through future administrations. Although my views on the role OIRA should play in enforcing any regulatory budget constraints differ from Tozzi's (and putting to one side altogether the underlying conceptual and practical issues related to "regulatory budgets"), I think he has made important and thoughtful proposals that will no doubt be the subject of serious discussion and consideration going forward.

Reference

Tozzi, J. 2019. "Office of Information and Regulatory Affairs: Past, Present, and Future." *Journal of Benefit-Cost Analysis*, 11 (1), doi: https://doi.org/10.1017/bca.2019.26.

---

1 Howard Shelanski, "Regulatory Review by the Numbers" (posted August 31, 2016), https://obamawhitehouse.archives.gov/blog/2016/08/31/retrospective-review-numbers-0.

Allen Bellas* 🆔 and Lea Kosnik

A Retrospective Benefit-Cost Analysis on the Elwha River Restoration Project

Abstract: In 1992, Congress passed The Elwha River Ecosystem and Fisheries Restoration Act with the goal of "full restoration of The Elwha River Ecosystem and native anadromous fisheries." As part of that act, the federal government was required to produce a benefit-cost analysis on dam removal of the Elwha and Glines Canyon dams, which was published in 1994. This article revisits that initial 1994 benefit-cost analysis; background on its methods and assumptions is given, comparisons are made to current state-of-the-art techniques in benefit-cost analysis, and an ex post benefit-cost analysis of the project is conducted for comparison purposes. We find that the cost and scope of the project exceeded original expectations, the cost of the foregone electricity generation was less than expected, and that anticipated recreational and fisheries benefits were both delayed, and lower, than expected. Furthermore, issues such as the value of hatchery-spawned versus wild anadromous fish seem not to have been anticipated in the original analysis, highlighting the fact that in doing an ex ante analysis, researchers must expect that unexpected factors may influence the ex post results of any project.

Keywords: cost-benefit analysis; dam; hydropower; electricity; river restoration.

JEL Classifications: Q2; Q4; Q5; H8

1 Introduction

Benefit-cost analysis (BCA) is a valuable methodological tool for empirically analyzing the effects of large regulatory projects. Although benefit-cost analysis is not without debate concerning some of the assumptions and perspectives involved (Kelman, 1981; Bronsteen et al., 2012), its usefulness as a tool in framing and suggesting potential effects of a project is widely understood. Benefit-cost analyses,

_____

*Corresponding author: Allen Bellas, College of Management, Metropolitan State University, Minneapolis, MN 55403, USA, e-mail: allen.bellas@metrostate.edu
Lea Kosnik: Department of Economics, University of Missouri-St. Louis, St. Louis, MO 63121-4499, USA

for the most part, are done *a priori* or before a project is actually constructed and implemented. In medias res and ex post cost-benefit analyses, while often discussed as worthwhile, are rarely implemented. This is a shame. Ex post cost-benefit analyses of large federal projects, if done more often, could inform researchers and analysts on the accuracy of assumptions made and the usefulness of methods frequently utilized. Indeed, the Office of Management and Budget (2016) has estimated that federal-level government ex ante BCAs are conducted every year, affecting all agencies of government and spending that reaches into the billions of dollars. A better understanding of their accuracy would be useful.

In addition, dam removal, or at least a reassessment of hydroelectric dam utilization and valuation, is a growing area of study (Loomis, 1996, 2002; Pohl, 2002; Kotchen et al., 2006; Lewis et al., 2008; Provencher et al., 2008; Robbins & Lewis, 2008; McKean et al., 2010, 2012; Null et al., 2014). There are an increasing number of analyses looking into particular aspects of dam valuation and impact; however, few of these papers investigate the benefits and costs of hydropower dams in a comprehensive fashion. One noteworthy, if rather old, exception to this is a study of the Colorado-Big Thompson Project from the 1980s (Howe, 1987), which analyzes the project from both regional and national perspectives. This current study of the Elwha River Restoration Project provides a rare, comprehensive ex post benefit-cost analysis of complete dam removal.

For the most part, we find that the initial benefit-cost analysis was carefully and correctly prepared and arrived at a proper recommendation. However, in the ensuing decades from that initial analysis to implementation of the project and preparation of this ex post analysis, the expanding scope of the project has led to increasing costs. Unanticipated problems have delayed or diminished some of the benefits and at least two new valuation paradigms have contributed to changes in how the project's benefits might be viewed and valued. This highlights the difficulty in doing an ex ante cost-benefit analysis. Still, in this ex post analysis, we find as with the original analysis that the removal of the Elwha project dams led to large net benefits overall.

2 Background on the Elwha River Restoration Project

The Elwha River Project consists of two dams, the Elwha dam and the Glines Canyon dam, on the Elwha River in the state of Washington. The Elwha dam was constructed between 1910 and 1913, without any kind of fish passage facilities. The Glines Canyon dam was constructed between 1925 and 1927, also without any fish passage facilities. The two, historically privately owned dams, had a combined capacity of

18.7 MW and generated an average of 172 GWh of electricity annually, most of which was sold to a nearby pulp and paper mill.

The two dams were not without controversy from the start; before construction even began in 1910, the Washington State Fish Commissioner contacted the original owner of the project about legal requirements to provide passage for migrating fish. Unfortunately, the owner did not respond. Both dams were constructed without fish passage facilities (or a fish hatchery, a proposed compromise at the time), and together they blocked anadromous fish passage to more than 70 miles of the Elwha River and its tributaries. A number of native Elwha River anadromous fish runs, including spring and summer chinook, coho, pink, chum, and sockeye salmon, winter and summer steelhead, cutthroat trout, and native char, were severely diminished and the natural ecosystem was disrupted within a significant part of the Olympic National Park. Native American tribes that relied on these fish runs were especially affected including not just diminished fish passage, but blocked access to traditional fishing sites and cultural properties.

When the dams came up for licensing by the federal government in the 1980s,[1] the contentiousness of the situation among the dam owner, environmental interest groups, Native American tribes, and other stakeholders threatened to delay any sort of negotiated outcome for a long period of time (Gowan et al., 2006). Attempts to move the situation forward led to litigation and protracted expenses for all stakeholders involved. To resolve the situation, in a unique outcome historically for private dam management, Congress stepped in and passed a legislative settlement applicable to the Elwha River Project alone. The Elwha River Ecosystem and Fisheries Restoration Act was signed into law as Public Law 102-495 by President Bush in 1992.[2] The goal of this act was the "full restoration of The Elwha River Ecosystem and native anadromous fisheries." The Secretary of the Interior was authorized to acquire the dams and remove them if necessary to meet this stated goal. The Interior was first tasked with developing a benefit-cost analysis on dam removal or other alternatives (such as installation of fish passages, or removal of one dam but not the other) that would fulfill the stated goal. That benefit-cost analysis (Meyer & Lichtkoppler, 1995)[3] was provided to Congress in 1995 and is the basis for this article's comparative research study.

---

1 See Kosnik (2006) for an explanation of the federal regulatory hydroelectric dam relicensing process.
2 A timeline of the implementation of this act – which impacts the years for which certain benefits and costs can be counted – is provided in the Appendix.
3 Meyer and Lichtkoppler (1995) report was based extensively on data from Department of the Interior et al. (1994).

3 The original benefit-cost analysis

The original benefit-cost analysis considered several options for the Elwha River Project including removal of only the Elwha River dam, removal of only the Glines Canyon dam, the installation of fish passage facilities, or the removal of both the Elwha River and the Glines Canyon dams. The removal of both dams yielded the greatest net benefits and was the option actually implemented. The original benefit-cost analysis envisioned removal beginning in 1996 or 1997, taking 4 years, and involving investments and ongoing expenditures on water quality and sediment management during and shortly after the project. The time horizon for the original analysis was 100 years.

The original analysis provides an unusually good discussion of discounting and consideration of different rates of time preference. The rates at which future benefits and costs are discounted ranges from 0 to 7% (with a sensitivity analysis) and there is even mention of intergenerational impacts and the dramatic effect of discounting on their present value.[4]

After purchase of the dams for $29.5M,[5] $37.9M in 2012 dollars, the two primary costs of the dam removal are the cost of their physical removal and the cost of construction of accompanying facilities to support water quality and sediment control, hatcheries to increase the number of spawning fish, new flood control infrastructure, and the cost of the foregone electricity generation.

The 1995 estimates of the cost of physical removal, construction, and related costs varied considerably. Meyer and Lichtkoppler (1995, p. 36) state, "The present analysis assumes total cost benchmarks of $130 million, $70 million and $50 million, all excluding costs of $29.5 million to acquire the existing dams." Elsewhere (p. 46) they say, "Total project construction costs are scaled at $155 million, $100 million and $80 million respectively – inclusive of $29.5 million for project acquisition," although Department of the Interior et al. (1994) put this at $161.08M, including acquisition cost, in the table (table 15, p. 140) to which Meyer and Lichtkoppler refer. The widest possible range seems to be between $50M and $161.08M, excluding acquisition costs.[6] Adjusting to 2012 dollars, these estimates rise from $70M to

---

4 Meyer and Lichtkoppler (1995, p. 10).

5 The dollar amount of $29.5M was established in the Elwha River Restoration Act, Section 3(b). It was actually paid out in 2000, so the value reported in Tables 1 and 4, $37.9M, is this value in 2012 real dollars.

6 Meyer and Lichtkoppler (1995, p. 46) and Department of the Interior et al. (1994, table 15, p. 140). In a footnote about these costs, Meyer and Lichtkoppler refer to a memorandum to Bob Hamilton of the USBR, one of the coauthors. Department of the Interior et al. (1994, tables 13–16 in pp. 138–141) consider four different sediment management options with costs inclusive of acquisition ranging from $147.59M to $307.36M.

$183.7M.[7] The distribution of these costs over the project timeline is given in Department of the Interior et al. (1994), table 15, p. 40). Distributed over the timeline, the present value of the low and high estimates ranges from $70M, $183.7M when discounted at 0% to $50.64M, $132.89M when discounted at 7%.

The dams produced an average of 172 GWh of electricity annually. The 1995 analysis used a combination of local and regional power costs to assign this electricity an initial value of about $0.0337 kWh^{-1} and a resulting total value of $5.8M.[8] However, this includes an assumption that real electricity prices would increase by 2% annually until 2014 and then remain constant thereafter.[9] The present value of this foregone electricity over 100 years ranges from $109.6M if discounted at 7% to $816.4M if discounted at a rate of 0%.[10]

Restoration of anadromous fish species to the Elwha River was the primary motivation behind removal of the dams and is the first benefit discussed in the original analysis. Projected annual harvests for chinook, coho, pink, chum, and sockeye salmon and for steelhead are presented in the article. Although fish harvests would be suspended during dam removal, harvests were projected to restart anywhere from project year 3 for sockeye salmon to project year 6 for chinook salmon.[11] Harvests of all species were forecast to increase annually, growing steadily to long run equilibria 20–25 years after the start of project decommissioning. When fully recovered, the net value of the increased fish harvest to commercial fishers (both tribal and non-tribal) and to firms providing services to sport fishers is estimated in the original analysis at $3.66M, of which $3.16M accrues to commercial fishers and $0.50M accrues to sport fishers.[12] The present value of these commercial and sport fishing benefits over 100 years ranges from $212.61M and $29.41M if discounted at 0% to $10.26M and $0.94M if discounted at 7%. Distribution of this net value varies over time with sport fishing benefits occurring later than commercial fishing benefits. The implication is that the share of the benefits accruing to commercial fishers is smaller when discounting at a lower interest rate.[13] The recreational value of the opening of this river to sport fishers is not

---

7 Calculated using the GDP Implicit Price Deflator, downloaded from https://fred.stlouisfed.org/series/GDPDEF and using 1995:1 value of 74.803 and 2012:1 value of 104.466. For the sake of brevity, subsequent dollar values will be in 2012 real dollars. Exceptions include dollar values quoted directly from the original study and associated primary documents.

8 Meyer and Lichtkoppler (1995, table 2, p. 13 and table 4, p. 15).

9 Meyer and Lichtkoppler (1995, p. 12). The actual wording regarding this in a footnote is, "The most responsible procedure is therefore to estimate real cost trends to the limit of empirically based analysis (2014), and then balance benefits and costs beyond that date within the overall project reporting framework."

10 Meyer and Lichtkoppler (1995, pp. 46, 51, 56).

11 Meyer and Lichtkoppler (1995, tables 5–10).

12 Meyer and Lichtkoppler (1995, table 13, p. 27). This is the Alt. 5 value of $3.46M less than the Alt. 1 value of $0.84M, the value of the harvest with the dams in place.

13 This can be seen in Meyer and Lichtkoppler (1995, tables 26–31).

specifically included in this part of the analysis, but it might be seen as part of either the non-market benefits associated with increased visitation or the non-market benefits captured in the contingent valuation analysis to be described below.

In addition to fishing, it was assumed that dam removal would result in increased visitation to Olympic National Park and to Clallam County more generally. The authors acknowledge that realization of these benefits would not be immediate, saying, "(Recreation and tourism) benefits are assumed to be zero for the first six years of project life, and are then assumed to increase in 10 even increments to the benefit levels displayed in Section V."[14] The net value of this increased tourism to local service providers was estimated at $8.0M annually.[15] The present value of this benefit stream is $729.68M when discounted at 0% and $60.87M when discounted at 7%.

Non-market benefits generate nearly all of the benefits described in the original analysis, typically more than 98% of all claimed benefits from dam removal. Although it is certainly interesting to review and critique other parts of the analysis, non-market benefits constitute the greatest influence in this analysis overall. The non-market benefits used in the original analysis are from a paper subsequently published by Loomis (1996), which estimates mean annual willingness-to-pay (WTP) over 10 years for Elwha River restoration at $59 per household in Clallam County (the county in which the dams were located), $73 per household in the rest of the state of Washington, and $68 per household in the rest of the USA.[16] All future benefits from the project are assumed to be capitalized in the 10 years of payments described in the study.[17] The annual WTP on the part of all U.S. households for the Elwha Dams' removal was $6275.2M, although Loomis also reports a reduced mean value based on the assumption that all non-response values were zero of $3469.4M, or, in 2012 dollars, $8763.6M and $4845.2M, respectively. The present value of the reduced mean over 10 years ranges from $36,485M to $48,561M in 2012 dollars, depending on discounting. For the summary presented below, we will use the (conservative) reduced mean value.

Finally, damming the Elwha River greatly reduced sediment delivery to Ediz Hook, a spit of sand and other sediment that provides the only protection for Port Angeles harbor.[18] The combination of damming and antierosion efforts on sea cliffs around Port Angeles had led to the U.S. Army Corps of Engineers doing regular maintenance to preserve Ediz Hook. Removing the dams was projected to restore sediment delivery to the spit beginning in year 8 of the project, and reduce annual preservation expenditures by $39,103 in 2012 dollars.

---

14 Meyer and Lichtkoppler (1995, p. 49).
15 Meyer and Lichtkoppler (1995, p. 31).
16 Loomis et al. say, "Since most of the costs of dam removal and river restoration would take place in the first 10 years, respondents were told they would pay this amount each year for 10 years." (p. 443).
17 Meyer and Lichtkoppler (1995, p. 33).
18 Meyer and Lichtkoppler (1995, p. 44).

Table 1 Original benefit-cost analysis – summary.

	0% discount rate (in millions of 2012 dollars)	7% discount rate (in millions of 2012 dollars)
Costs		
• Purchase of dams	37.9	37.9
• Physical dam removal and construction of accompanying facilities	70–183.7	50.64–132.89
• Lost electricity value (172 GWh annually) over 100 years	816.4	109.6
Benefits		
• Restoration of anadromous fish species over 100 years	242.02	11.2
• Increased visitation to Clallam County over 100 years	729.68	60.87
• Non-market benefits over 100 years	48,561	36,485
• Ediz Hook maintenance savings over 100 years	3.64	0.37

Table 1 summarizes the benefit-cost information from the original analysis.

Depending on whether high or low cost removal and construction assumptions are used, and the assumed discounting rate, the benefit-cost ratio from the original analysis ranges from 47.72 to 184.50, and the net present value (NPV) from $36,277M to $48,612M, in 2012 dollars.

Increasing the discounting rate reduces the project's NPV but, counter-intuitively, increases the benefit-cost ratio, a result of the far greater magnitude of the project's benefits compared with its costs.

Note that the numerical results we have calculated above differ from those in the original report. The original report yielded values for costs ranging from $664.6M to $739.9M at 0% discounting and from $138.2M to $195.6M at 7%, and benefits of $36,634M at 0% and $25,246.0M at 7%,[19] resulting in the following 2012$ NPV and benefit-cost ratio figures:

Although we were unable to perfectly replicate the results of the original study, our NPV and B/C figures closely approximate those from the original study.

4 Methodological issues with the original benefit-cost analysis

Overall, the original analysis was properly conducted and the authors should be commended for a fine report. The authors considered four approaches to restoration,

---

19 Meyer and Lichtkoppler (1995, table 26, p. 51 and table 31, p. 56).

making this a comprehensive investigation of the problem rather than just a single solution. The descriptions and derivations of the costs and benefits of the dam removal project were thoroughly discussed. Sensitivity of the analysis to different discount rates was well presented. With the benefit of over two decades of development of the theory and practice of benefit-cost analysis, however, several areas of critique arise. Among these are the price of acquiring the dams and whether it is properly considered a cost of the project, the time frames for the analysis and the assumptions inherent in those time frames, whether or not local tourism activity should be counted as a project benefit, and the lack of consideration of externalities associated with the alternatives for electrical generation.

The original benefit-cost analysis included the $29.5M purchase price of the dams as a cost. The correct treatment of this amount in an analysis depends on whether the owner of the dams to whom the payment is made has standing. Payment for the dams was made to the Fort James Corporation in 2001 (Clark, 2012). The Fort James Corporation had been acquired by Georgia Pacific in 2000.[20] If standing is universal, the purchase price is merely a transfer, but because the dam removal was a federal government project, standing might be national. According to the Office of Management and Budget's Circular A-94, "Analyses should focus on benefits and costs accruing to the citizens of the United States in determining net present value," raising the question of either the corporation's or the shareholders' nationality (Office of Management and Budget, 1992). If the corporation or its shareholders are American, even with national standing, the purchase price should be considered a transfer. A different point of view might be that standing is limited to the U.S. government and its various departments and agencies, in which case the price of the dams would be a cost.

Ultimately, if the owners of Fort James and Georgia Pacific have standing, then the $29.5M payment should be treated as a transfer from taxpayers to owners, and should not be considered a cost of the project.

Alternatively, there were several legal issues with the dam's existence and continued operation. The Elwha Dam was built without provisions for fish migration, a violation of Washington State laws. Both dams operated within Olympic National Park, and while this was not illegal at the time, new dams would not be permitted within a national park today and, at some point, renewal of these dams' operating permits would likely have become challenging. If the dam's construction and operation were in violation of state or federal laws, then the owners may be considered not to have standing and payments to them should be considered costs of the project. Indeed, one reason that James River, who owned the dams prior to Fort James'

---

20 https://www.gp.com/Company/Company-Overview/Locations/Green-Bay.aspx#tab-0   (accessed July 20, 2017).

ownership, investigated options for transfer to the federal government was a concern that the dams might be taken from him in some way anyway. If the dam owner's standing is in doubt then payment for the dams should be counted as a cost.

A final argument for including the $29.5M purchase price of the dams as a cost in the analysis is that the land being used for the project has an opportunity cost.[21] The $29.5M could therefore be considered as a valuation of the land's opportunity cost. Ultimately, it is not unequivocal whether or not to include the $29.5M governmental payout for the dams as a cost in the ex post benefit-cost analysis, but for conservative estimates, we have decided to include it.

The time horizon for the original study is complex. The decommissioning timeline encompasses a total of 17 years (eq. 1, p. 46) and reflects the presentation in an illustration from the Elwha Report.[22] Dam removal in this timeline begins in the fourth year of the project after some research and preliminary work on design, habitat and water quality preservation, and fish and habitat restoration has begun. Presumably, there would not be lost generation prior to dam removal. The cost of the foregone electricity generation is calculated over 100 years (eq. 2, p. 46), but this is inconsistent with the discussion in some supporting reports. The Federal Energy Regulatory Commission (1993) Draft Staff Report refers to a 30-year anticipated licensing term.[23] Department of the Interior et al. discuss the cost of replacement power from 1996 to 2025, suggesting a 30-year time frame, and also includes analysis using a 50-year time frame.[24] The 100-year time frame suggests that generation would have continued at the facilities until they were nearly 200 years old. Although it may be possible that the generating hardware could continue operating that long, at some point either basic structural failure or, more likely, silt accumulations in the associated reservoirs would likely become a limiting factor. Fishery and increased tourism benefits are also calculated over 100 years (eqs. 3–6, pp. 47–49).

The time horizon used by Loomis (1996), which serves as the foundation for most of the benefits of the removal, is particularly interesting. In the Loomis contingent valuation (CV) study, respondents are asked about their WTP on an annual basis for the dams' removal and the river's restoration, but only for 10 years, approximating the duration of the decommissioning project.[25] This makes for a credible scenario for the respondents; each household's payments over the course of the decommissioning project provide for the removal, which in turn results in the

---

21 We thank the editor and anonymous reviewers for this additional argument in favor of including the $29.5M cost in the final calculations.
22 Meyer and Lichtkoppler (1995, p. 46) referring to Department of the Interior et al. (1994, table 15, p. 140).
23 Federal Energy Regulatory Commission (1993, pp. 2–34).
24 Department of the Interior et al. (1994, pp. 44, 127, and 128).
25 Meyer and Lichtkoppler (1995, p. 33).

existence of a free-flowing river for the foreseeable future. The Elwha project analysis uses values from the Loomis report, saying, "These values apply each year for the first 10 years of the project. Since they 'capitalize' value over all future years, no project total non-market values should be counted subsequent to this 10 year period." Although this seems an appropriate and conservative use of the Loomis results, the published version of the Loomis paper does not discuss capitalization of the annual WTP values in this way. The time frame over which respondents might have been capitalizing values is not clear, and may have been in perpetuity, for 100 years, or for a shorter period of time. If respondents were valuing benefits over a shorter period of time, the Loomis values would be conservative relative to what the non-market values might be if applied over the 100-year time frame used in most of the paper.

Hypothetical bias is a concern with any contingent valuation study. In the years since the Loomis study, advances have been made in estimating and correcting for this bias and better calibrating values estimated from CV studies with those arrived at by other means such as through travel cost studies or experimental observations of actual WTP. Meta-analyses conducted by List and Gallet (2001) and by Little and Berrens (2004) suggest that mean calibration factors, the ratio between a CV estimation and an estimation from another technique, have an approximate value of three.

One calibration approach is to ask positive respondents a follow-up question to determine their level of certainty about their WTP, with results suggesting that including only those with a high degree of certainty yields CV valuations that best approximate valuations calculated by other techniques (Champ & Bishop, 2001; Blomquist et al., 2009; Rhodes et al., 2018).[26] Blomquist et al. look at WTP estimates for three medical interventions that respondents were first asked about in a CV context, and were then given the option to purchase.

Elimination of all but the most certain yesses (positive respondents) lowered mean WTP from $38.90 to $17.36 for a diabetes management program, from $33.24 to $9.69 for an asthma management program, and from $27.87 to $21.76 for a lipid management program, values that are roughly one half, a third, and three quarters of the maximum values and none of which demonstrated significant hypothetical bias when compared with actual WTP. Champ and Bishop look at WTP for wind power and find that when the yesses are limited to those with certainty rating of 8 or higher on a 10-point scale, approximately half of the yesses are removed with a corresponding 50% reduction in mean WTP.

---

26 Champ and Bishop go so far as to say that hypothetical bias can be essentially eliminated by recoding less certain positive respondents' responses to negative responses, based on a cutoff value of 8 on a 10-point scale.

Table 2 NPV and benefit-cost ratios as calculated above.

	Discounting at 0%	Discounting at 7%
Construction cost $70M	NPV = $48,612, B/C = 53.59	NPV = $36,359, B/C = 184.50
Construction cost $183.7M	NPV = $48,498, B/C = 47.72	NPV = $36,277, B/C = 130.38

Applying these more recent insights into hypothetical bias and contingent valuation, we can offer a sensitivity analysis of the Loomis study, remembering that the best estimate of the non-market benefits was $6.275B, but if all non-respondents were assumed to attach zero value to the project (perhaps analogous to excluding yesses with low levels of certainty) this figure fell to $3.47B.[27] If this lower value, based only on survey respondents, were subject to a certainty filter similar to those described above, we might arrive at a value that is one-third to one half of the original, perhaps between $1.15B and $1.73B, consistent with the assumption that all non-respondents attach no value to the project (perhaps explaining why they did not respond) and that only a fraction of those who chose to respond would actually be willing to pay, were they given the opportunity. Even under this very conservative correction for hypothetical bias, the benefits of the removal project would still overwhelm the costs. As shown in Table 2, the NPV of the project is approximately $48B discounting at 0% and $36B discounting at 7%. Reduction of the non-market benefits to a third of their value would still leave the project with NPVs in the range of $11.95B–$16.24B and benefit-cost ratios ranging from 16.53 to 61.74.[28]

The original study included increased visitation to Clallam County as a benefit of the dam removal and river restoration. Specifically, both increased net revenues for local tourism service providers and total WTP on the part of additional visitors were included as benefits. This presents at least a couple of challenges. Including both visitors' WTP and providers' profits double counts those profits, and a better measure of this benefit would be the sum of additional visitors' consumer surplus and providers' profits. More importantly, however, it is likely that most of the additional visitation to Clallam County would come at the expense of visitation to other natural areas in the USA. If standing in the study is national, then most of the additional tourism revenue that accrues to Clallam County would represent a transfer from elsewhere in the USA, and be neither a cost nor a benefit.

The original analysis was thorough in its description of the importance of the Elwha River and fishing on the Lower Elwha S'Kallam Tribe, and this was also discussed in Department of the Interior et al. (1994) as, "The removal of both dams represents the only possible opportunity to fully restore the native anadromous

---

27 Loomis (1996, p. 446).

28 Starting from the values in Table 2 and reducing the value of the non-market benefits to $16.187B and $12.161B and then proceeding as before to calculate NPV and B/C.

Table 3 NPV and benefit-cost ratios as calculated in original paper.

	Discounting at 0%	Discounting at 7%
Construction cost $70M	NPV = $50,247, B/C = 55.14	NPV = $35,064, B/C = 182.68
Construction cost $183.7M	NPV = $50,141, B/C = 49.53	NPV = $34.984, B/C = 129.07

fisheries, which are the Elwha S'Kallam Tribe's most valuable economic and cultural resource."[29] The Federal Energy Regulatory Commission (1993) echoes these sentiments, saying, "The Klallam have repeatedly stressed the importance of the river and its resources, particularly the anadromous fish resource, as the most significant single aspect of their cultural identity… To the Klallam, restoration of the anadromous fishery in the Elwha and shellfish populations at its mouth would represent a partial restoration of Klallam culture and a restoration of their fish harvest rights…"[30] Although the authors of all three of these reports were responsible in their acknowledgement of this aspect of the project, no attempt seems to have been made to explicitly value the potential for cultural restoration. Admittedly, this is, even now, a nascent concept in benefit-cost analysis and, to the authors' knowledge, has not been explicitly attempted. This would, however, be an important source of additional benefits if measured, or if that is not possible because of cultural sensitivities, unmeasured but acknowledged.

The original analysis failed to acknowledge the issue of the excess burden of taxation associated with the project's costs. As has been established in the economics literature, taxes distort behavior to different degrees and, as a result, impose net costs on an economy rather than serving simply as transfers from taxpayers to the government.[31] A range of values for the rate of excess burden has been calculated, depending largely on the type of tax being considered.[32] Because tax revenues are fungible, it is impossible to determine which sort of tax is used to fund both the acquisition of the dams and the real costs of the project, so some average value could be used in calculating the excess burden.

Finally, while the original analysis was thorough in much of its description and discussion, one overarching criticism is the lack of clarity regarding calculations of the present value of the various benefit and cost streams and the resulting NPV of the project (as noted at the end of the last section, and which gives rise to the disparities between Tables 2 and 3). Repeated attempts were made to replicate the calculations of the original analysis, but while those original results were approximated, differences remained and seemed capricious.

---

29 Department of the Interior et al. (1994, p. 44).
30 Federal Energy Regulatory Commission (1993, pp. 3–108).
31 See, for example, Jorgenson and Yun (1991).
32 Bohanon et al. (2014).

Table 4 Ex post benefit-cost analysis – summary.

	0% discount rate (in millions of 2012 dollars)	7% discount rate (in millions of 2012 dollars)
Costs		
• Purchase of dams (if included at all, and not simply a transfer)	37.9	37.9
• Physical dam removal and construction of accompanying facilities	295.1[33]	213.5
• Lost electricity value (172 GWh annually) over 100 years	602	91.9
Benefits		
• Restoration of anadromous fish species	171.6	7.6
• Increased visitation to Clallam County	542.5	54.5
• Non-market benefits	35,079	26,355
• Ediz Hook maintenance savings	2.60	0.27
• Value of dam removal to indigenous people	$X > 0$	$X > 0$

5 An ex post benefit-cost analysis of the Elwha River Restoration Project

Thus far, we have described the original benefit-cost analysis of the project. We now turn to the differences between the original vision of the project and its actual implementation, and the subsequent implications for measurement of project benefits and costs.

The total budget for removal of the dams and planning, construction, and management of related structures was $325M. Of this amount, only $29.9M, or about 9.9% went to dam acquisition. $32.9M, or about 10.4% was spent on removal and decommissioning of the dams and their associated power facilities. The majority of the budget was spent on maintaining water quality in the Elwha River and for people who draw upon the Elwha as a water source. Fully 46.2% of the project budget was dedicated to projects related to water quality, including surface water intake and water treatment facilities to preserve delivered water supplies during periods of increased turbidity as accumulated sediment from the reservoirs found its way downstream. In addition, 7.1% of the budget was dedicated to operation and maintenance of these facilities. Construction of hatcheries and restoration, and monitoring of fisheries accounted for 7.2% of the budget. Loss of the dams meant loss of their

---

33 The $295.1M figure is calculated by subtracting the $29.9M acquisition cost from the project's $325M total budget.

flood control services and as a result, approximately 6.0% of the budget was dedicated to flood control projects. Planning, design, and management accounted for 6.6% of the budget with assorted, smaller items constituting the rest. The present value of these expenditures, distributed over the original project time-cost profile, is between $213.5M and $295.1M, depending on discounting.

Ex post valuation of foregone electricity generation differs from ex ante valuations. The original paper suggested an average value of the foregone electricity generation roughly equivalent to the lowest electricity rate offered to power customers near Port Angeles (the city at the mouth of the Elwha River). This was approximately $0.035 kWh^{-1} in 2017, or $0.0317 kWh^{-1} in 2012 dollars,[34] for an annual value of $5.4M in 2012 dollars. However, there was also an inherent assumption in the original analysis that real electricity prices would rise by 2% annually in the initial years of the project and its aftermath, which seems not to have happened. Since the preparation of the original report, the Bonneville Power Authority's real price for electricity has generally ranged from $0.03 to $0.04 kWh^{-1} in 2012 dollars,[35] suggesting an annual value for the foregone generation of between $5.2M and $6.9M with a midpoint of $6.0M. The present value of 100 years of foregone generation, according to the assumptions of the original study, was between $93.3M and $816.4M, discounting at rates of 7 and 0%, respectively. Using an average value of $0.035 kWh^{-1} (equivalent to $6.02M annually) over a 100-year time period and no annual increase in real electricity prices, the ex ante value of the foregone electricity is between $91.9M and $602.0M, again in 2012 dollars and discounting at rates of 7 and 0%, respectively.

If the purchase of the dams is included as a cost (and not as a transfer among parties both of which have standing in the analysis), the original $37.9M figure is correct.

The original analysis discussed the recreational, commercial, and non-use existence value of restored runs of anadromous fish species in the Elwha River, presenting numbers of fish and pounds of harvest for six different species. This presentation, although well calculated, did not distinguish between native, wild fish, and hatchery fish. There is a belief that fish that begin life in hatcheries might displace wild fish, and because hatchery fish are less successful at survival and reproduction, they will compromise the genetic integrity of a river's wild population.[36]

These concerns underlie an ongoing debate regarding tradeoffs between conservation and harvest objectives in fisheries.

---

34 http://www.electricitylocal.com/states/washington/port-angeles/ (accessed July 26, 2017). "The average industrial power rate in Port Angeles is $0.0345 kWh^{-1}." Adjusting from 2017:7 to 2012:1 values as described earlier in the article, this is $0.0317 kWh^{-1}.

35 Historical Firm Priority Power Rates – no transmission, FY1984-2017.

36 See, for example, Chilcote et al. (1986).

The original analysis made no distinction between hatchery and wild fish and included in its analysis the cost of a hatchery to help stock the newly freed river, suggesting that harvest objectives were considered over conservation of wild species. It may be, however, that after a century of the river being dammed, the question of what would constitute a native anadromous species specific to the Elwha River might be purely academic. Furthermore, while there was disagreement about hatcheries at the time the original analysis was published, the issue of valuing wild versus hatchery fish was not generally addressed in benefit-cost analyses at that time.

Either way, the lag from project completion to fish harvest seems to be exceeding that of the original analysis, which forecast harvests beginning between 2 and 6 years into the project. Actual dam removal began in September 2011 and concluded in August 2014. If these are taken as project years 1 and 4, the original analysis forecast harvests beginning between 2012 and 2016. In March 2017, an existing moratorium on fishing in the Elwha River was extended to June 2019.[37] This suggests that harvests will be delayed until at least the ninth project year, delaying the resumption of harvests by 3–7 years, and decreasing their present value. A report from the Washington Fish and Wildlife Commission from September 2017 stated that chinook and steelhead populations were far short of long-term recovery goals (Anderson & Hoffman, 2017).

It is difficult to say how the delayed start to harvesting fish on the Elwha River might affect the valuation of this project. Other things being the same, the delay represents lost harvest that cannot be recovered over the 100 years incorporated in the analysis, and while harvests in these early years would be significantly less than the long run, sustainable maxima, their early appearance in the benefit stream would make their present value relatively high, especially when discounting at 7%. Setting aside discounting issues, removal of 5 years of benefits from a mature fishery would reduce benefits by approximately $18M (see online supplementary material for calculated values). Alternatively, delaying the start of even modest levels of fishing might accelerate the recovery of native runs and speed the approach to long run equilibria at some maximum sustainable harvest.

Setting aside the question of whether it is appropriate to include local tourism benefits in a study where standing is assigned nationally, it is difficult, even ex post, to discern the impact of Elwha River dam removal on visitation and tourism on the Olympic Peninsula and at Olympic National Park. Visitation figures for the national park show a steadily increasing trend from 2012 to 2017, but most of this increase was from 2012 to 2014. Furthermore, visitation figures have ebbed and flowed in the past and attributing this increase to any one effect would seem precarious. Furthermore, while the dam removals did free the river, remaining debris has made the river too

---

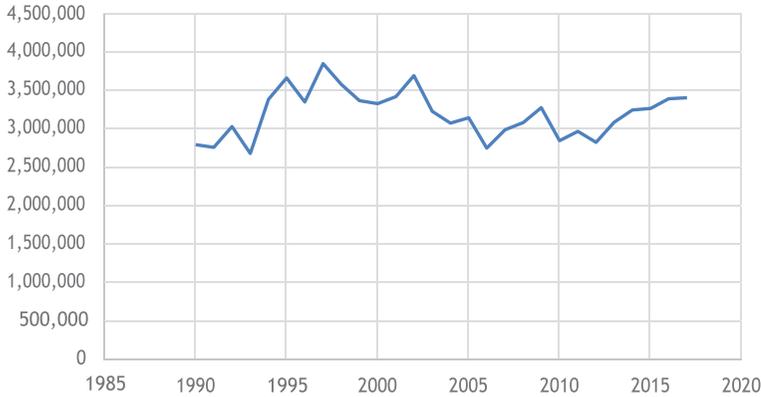**37** Washington Department of Fish and Wildlife (2017).

Figure 1 Olympic National Park visitation.
Source: National Park Service Visitor Use Statistics – Annual Park Recreation Visitation (1935–last calendar year). Available at https://irma.nps.gov/Stats/Reports/Park/OLYM (accessed April 13, 2018).

dangerous for rafting and kayaking and, at least up to 2017, this recreational opportunity has gone unfulfilled on the Elwha. If the impact of the dams' removal on visitation is negligible, the question of standing in this case may be moot (Figure 1).

Similar to tourism benefits, impacts on Ediz Hook are difficult to discern ex post because various factors, including major storm events and choices of different maintenance options, can overwhelm the impact of the project (Corps of Engineers, 2016). Research suggests that additional sediment from the Elwha River is depositing offshore (Gelfenbaum et al., 2015) and may be transported to Ediz Hook, but identifying a specific impact on maintenance expenditures would be complicated at best.

Adding consideration of the excess burden of taxation will add to both the real costs of the project and to the acquisition cost of the dams. The total budget for the project as enacted was $325M, and if an excess burden rate of 30% is applied, the cost of the project would increase by $97.5M.

Regarding non-market, non-use, existence values for the fish populations restored, a broad review of the literature on valuation of river restoration by Bergstrom and Loomis (2017) included household WTP figures from 18 analyses of projects, with an average value of $79 (table 2, p. 13). Work by Stratus Consulting (2015) looking specifically at the Elwha River estimated annual household WTP for different degrees of salmon restoration in the neighborhood of $220 to $380 (Stratus, pp. 7-13, 7-14). Their response rates were 21.95% for Internet surveys and 35.04% for mail surveys (Stratus, p. 7-2). Loomis et al. found median household WTP of between $59 and $73 and had response rates of 77% for Clallum County, 68% for the rest of Washington, and 55% for the rest of the USA. Loomis et al. generated a lower bound for their estimates by assuming non-

Table 5 Ex post NPV and benefit-cost ratios.

	Discounting at 0%	Discounting at 7%
No excess burden	NPV = $34,318, B/C = 37.70	NPV = $26,020, B/C = 76.79
30% excess burden	NPV = $34,218, B/C = 34.06	NPV = $25,838, B/C = 50.23

respondents had zero WTP and arrived at a lower bound for U.S. national benefits of $3B (Loomis, pp. 443–444). Applying the same practice to Stratus values yields conservative lower bounds for household WTP of about $67 for Internet respondents and $77 for mail respondents and for national WTP on the order of $8B. The valuation result in the original analysis of the Elwha restoration project was dominated by existence values. Although non-use existence values can never be made completely concrete, the values presented in the original analysis seem consistent with subsequent analyses.

Ex post calculations of the NPV and benefit-cost ratios strongly suggest that this project was beneficial, and this conclusion is robust to changes in assumptions. Using a 100-year time horizon, including both commercial and sport fishing benefits without delay but excluding tourism benefits[38] yields the results displayed in Table 5. Adding tourism benefits would increase the present value of the benefits by $542.5M discounting at 0% and by $54.5M discounting at 7%. As shown in the table, adding an excess burden of taxation of 30% has only a small impact on NPV and benefit-cost ratios. As mentioned above, each year of delay in the resumption of commercial and sport fishing in a mature fishery would cost $3.66M in net benefits, a small impact relative to the values shown.

6 Comparisons of the ex ante and ex post benefit-cost analyses

(i). The cost of the removal wound up being, even in real terms, much greater than was originally forecast, not because of the removal of the dams themselves but because of water quality, sediment management, and flood control measures that needed to be constructed to replace the services lost with the removal of the dams.

(ii). Electricity prices seem not to have risen as was originally forecast, so the cost of foregone electricity generation has likely been less, especially if valued on a regional basis, than was forecast.

---

38 The justification for this exclusion being that increased tourism, if indeed there is increased tourism, comes at the cost of tourism elsewhere in the country.

(iii). Delays in fish harvests and recreation opportunities including rafting and kayaking, as well as difficulties in discerning increases in visitation, suggest that at least some of the benefits that were claimed have not yet been realized. These delays reduce the present value of the project's benefits.

(iv). The one thing that would seem unaffected by the passage of time is the contingent valuation benefits. As these are the overwhelming majority of benefits, and they dwarf the costs of the project, the overall desirability of removing these dams would seem to remain. Indeed, this reality seems to be echoed in a paper (Gowan et al., 2006) that asks, at one point, if these dams were going to be removed anyway, why do a CV study about their removal? It may be that when something is politically popular in spite of the fundamental economics behind it being shaky, contingent valuation reveals sentiments in the relevant population that are consistent with that overwhelming political popularity. That being said, Senator Slade Gorton managed to block the removal of these dams for years until his political career ended, so while it is easy to assert the political popularity of the removals after the fact, the reality at the time may have been quite different.

The important criticism of the contingent valuation non-use values of the restored river may be the delay in the return of anadromous fish. Bergstrom and Loomis (2017) review 38 studies estimating the benefits from river restoration projects. Of these, approximately 70% had as their primary goal the restoration of fisheries, including the preservation of threatened and endangered fish, restoration of native species, and dam removal for the benefit of migratory fish. Although fishery benefits seem to be preeminent among river restoration projects, it is worth noting that approximately 30% of the studies and projects examined by Bergstrom and Loomis had other goals. This suggests that it is conceivable that a freed river could have value, even if it temporarily, at least, holds fewer fish than expected. By what percentage the value might be diminished by lack of fish is a matter for speculation.

The original Loomis (1996) study did not anticipate separability of the river and the fish. The valuation question put to respondents of this contingent valuation study was, "If a majority of people are not willing to pay the cost of dam removal, the dams would remain. Fish populations would be as shown in the bar chart under the Dams & Fish Ladders alternative. If a majority of people agree to pay the costs, the dams would be removed, the river would be restored to a natural state, and fish populations would increase as shown in the bar labeled Dam Removal." (Loomis, 1996, p. 443) Separation of the river from the fish was not done, and perhaps not even imagined at the time, so it is impossible to say how the apparent outcome might have been valued at the time.

(v). Changing worldviews and the introduction of new schools of thought are
very difficult to predict, and at least two of these impact the analysis of this
dam removal project. The first is the somewhat new distinction between
hatchery and wild fish. Although the construction and operation of hatcher-
ies was certainly seen as necessary to increase nominal numbers of anadro-
mous fish using the Elwha River, these hatchery fish compete with wild runs for
resources. Although wild fish might be slower in repopulating the river, there
might be greater long run value in their doing so, depending on the relative
values people attach to wild versus hatchery fish. The second is the value
attached to some degree of restoration of traditional lifestyles for Native Amer-
icans. The values that both native and non-native populations might attach to the
resumption of traditional harvests and the cultural connotations of these harvests
was not a focus of the original Loomis study, but may be valuable in the context
of this project. Valuation of indigenous rights is a nascent area of study (Navrud
& Ready, 2002; Rizzo & Mignosa, 2013), with few empirical measurements and
even less agreement on methods, but regardless, it can be assumed that its value
would be positive, thereby increasing the already large net benefits attributed to
the removal of the Elwha project dams. Both of these novel changes in people's
views of the world probably could not have been predicted and are one of the
fates to which an analysis of any long-term project is necessarily exposed.

7 Conclusions

The Elwha River dam removal project is a rare example of a two decade lag between
an ex ante benefit-cost analysis and eventual implementation. The eventual resolu-
tion of the project differed from expectations in several ways. Unsurprisingly,
perhaps, the scope and cost of the project expanded, even in real terms, as many of
the services provided by the dams needed to be replaced, and water quality issues
arose. More surprisingly, electricity prices did not rise as expected and anadromous
fish species have not returned in the hoped-for numbers. Early analysts could not
have reasonably been expected to anticipate changes in attitudes toward hatchery-
raised fish, or the nascent idea of valuing the preservation or renaissance of native
people's cultural heritage and way of life. Any ex ante benefit-cost analysis can be
expected to involve assumptions and considerations that, with the passage of time,
change. The Elwha River Project is no different. The good news is that, while some
early assumptions have turned out to be incorrect, egregious a priori assumptions that
vastly skew the results do not appear to have been made.

How typical is the Elwha River Project analysis to other ex ante benefit-cost
analyses? Unfortunately, as documented in the literature review in the Introduction
section, there are few comparative ex ante/ex post dam-related benefit-cost analyses

readily available for comparison.[39] Although this example provides hope that early benefit-cost analyses on large projects are not wildly off ex post results, we can in no way state that this is the usual or expected outcome; there simply are not enough comparative analyses out there. A quick literature review of other large-scale ex ante/ ex post comparative benefit-cost analyses, on topics outside of hydropower dams, also turns up virtually no useful comparison studies. An extremely pertinent future research agenda, therefore, would be to conduct more ex post benefit-cost analyses like this one, in order to gauge how well, or how poorly, ex ante benefit-cost analyses appear to do over time.

In the meantime, analysts conducting benefit-cost analyses should, as these original authors did, continue to observe standards of practice and strive to completeness and care in measurement, knowing that they should expect various factors, some possibly foreseeable and some not, to arise and drive a wedge between the ex ante expectations and the ex post results. Perhaps the greatest practical suggestion to future practitioners is to keep very clear, thorough, and replicable records of all numerical calculations implemented, so future comparative efforts can be made with a strong degree of numerical accuracy.

Supplementary material

To view supplementary material for this article, please visit
https://doi.org/10.1017/bca.2019.31

---

39 The Howe (1987) study on the Colorado-Big Thompson Project was not so much an examination of ex ante versus ex post valuations as an examination of the project from regional and national viewpoints.

Appendix
Timeline of implementation of The Elwha River Ecosystem and Fisheries Restoration Act[40]

In January 1992, the 102nd Congress of the USA passed The Elwha River Ecosystem and Fisheries Restoration Act, or "The Elwha Act." Public Law 102-495 authorized the Secretary of the Interior to acquire the two hydroelectric dam projects and implement the actions necessary to achieve full restoration of the Elwha River and the native anadromous fisheries therein.[41] The act limits the acquisition price to $29.5M and requires that the Secretary of the Interior prepare and submit a restoration plan by January 1994.[42] When released in January 1994, the final version of the "Elwha Report" discussed several possibilities for restoration including removal of either the Glines Canyon dam or Elwha River dam and modification of the dams to facilitate fish passage, but recommended removal of both dams in order to meet the Elwha Act's goal of full restoration of The Elwha River Ecosystem and native anadromous fisheries.[43] This decision was affirmed by the Final Programmatic Environmental Impact Statement, which was released in June 1995. In February 1996, a Record of Decision was signed in favor of dam removal and in February 2000, Secretary of the Interior, Bruce Babbit, finalized federal acquisition of the projects.

The Elhwa Act provided for preservation of the quality and availability of water from the Elwha River for industrial and municipal uses, and construction of infrastructure related to this necessarily preceded work on dam removal. In August 2007, the National Park Service (NPS) awarded a $24.5M contract to Watts Constructors LLC and John Korsmo Company (Watts/Korsmo A JV), based in Gig Harbor, Washington, for construction of the Port Angeles Water Treatment Plant (PAWTP). The eventual cost of this plant would be nearly $30M. In December 2007, NPS awarded a $69.6M contract to Watts Constructors LLC and DelHur Industries, Inc. for construction of Elwha Water Facilities, which included a new surface water diversion and intake, industrial water treatment plant, and area flood protection.

Construction on the PAWTP began in December 2007.[44] (http://www.water-technology.net/projects/portangeleswatertrea/). In October 2008, NPS officials

---

40 https://www.nps.gov/olym/learn/historyculture/timeline-of-the-elwha-1992-to-present.htm

41 https://www.nps.gov/olym/learn/historyculture/the-elwha-act.htm

42 https://www.nps.gov/olym/learn/nature/upload/ElwhaAct.pdf

43 https://www.nps.gov/olym/learn/historyculture/timeline-of-the-elwha-1992-to-present.htm

44 http://www.water-technology.net/projects/portangeleswatertrea/

reached an agreement with the City of Port Angeles to transfer ownership of the PAWTP to the city upon its completion. The PAWTP became operational in February 2010.[45] In April of that same year, construction of Elwha Water Facilities project, consisting of the $48M Elwha Water Treatment Plant and the $29M Elwha Surface Water Intake, was completed.[46]

The Elwha Act also provided for full restoration of native anadromous fisheries, and to this end, a number of projects were constructed. In September 2009, work began in the Washington Department of Fish and Wildlife (WDFW) rearing channel at Morse Creek. Beginning in 2010, chinook salmon were transferred to Morse Creek, an adjacent stream whose water quality would not be impacted by dam removal, to insure protection of each returning year class of fish.[47] In February 2010, construction began on the Lower Elwha Klallam Tribe fish hatchery, funded by the American Recovery and Reinvestment Act of 2009.[48, 49] Work on the hatchery was completed in May 2011.[50] Further assurance of the recovery of the fisheries was added in February 2011 when the Washington Fish and Wildlife commission approved a 5-year fishing moratorium on fishing in the Elwha River, to begin in March 2012. This moratorium would later be extended to June 2019.[51]

At last, with the necessary supporting projects in place, work on the actual removal of the dams began in September 2011.[52] Removal of the Elwha River dam was completed in March 2012 and removal of the larger Glines Canyon dam was completed in August 2014.[53]

With the actual removal of the dams, several unanticipated problems arose. Beginning in October 2012, the Elwha Water Treatment Plant, part of the facilities that constituted the largest part of the project budget, began to experience problems when sediment and woody debris overwhelmed its water intake structures and treatment facilities. This occurred despite sediment levels being well below those that the plant was designed to handle.[54] A dispute between the City of Port Angeles and the NPS related to design flaws in the water treatment facilities and the cost of

---

45 https://www.nps.gov/olym/learn/nature/port-angeles-water-treatment-plant.htm
46 https://www.nps.gov/olym/learn/nature/water-treatment-overview.htm
47 https://govtribe.com/project/operation-and-maintenance-services-at-morse-creek-acclimation-and-rearing-pond-facility
48 https://www.nps.gov/olym/learn/historyculture/timeline-of-the-elwha-1992-to-present.htm
49 https://www.nps.gov/olym/learn/nature/lower-elwha-klallam-tribe-fish-hatchery.htm
50 https://www.nps.gov/olym/learn/nature/lower-elwha-klallam-tribe-fish-hatchery.htm
51 http://wdfw.wa.gov/commission/meetings/2017/09/sep0817_14_presentation.pdf
52 https://www.nps.gov/olym/learn/nature/dam-removal-overview.htm
53 https://news.nationalgeographic.com/2016/06/largest-dam-removal-elwha-river-restoration-environment/
54 https://www.seattletimes.com/seattle-news/elwha-dam-removal-hostage-to-water-plant-repairs/

addressing these flaws and higher than expected operating costs is ongoing and handover of the plant to the City seems to have been delayed indefinitely.[55,56,57]

In addition to problems with water treatment facilities, there have been issues with other benefits that the dams' removal was expected to yield. In June 2016, NPS concessionaire Olympic Raft and Kayak stopped taking clients on trips down the Elwha River because of safety concerns regarding the remaining debris from dam removal projects.[58] In March 2017, commercial and recreational fishing were delayed as well when the pre-existing fishing moratorium on the Elwha was extended to June 2019.[59]

References

Anderson, Joe, and Annette Hoffman. 2017. Elwha River Dam Removal, Fish Status Update, and Fishing Moratorium. Available at http://wdfw.wa.gov/commission/meetings/2017/09/sep0817_14_presentation.pdf. (accessed November 22, 2017)

Bergstrom, John C., and John B. Loomis. 2017. "Economic Valuation of River Restoration: An Analysis of the Valuation Literature and Its Uses in Decision-making." *Water Resources and Economics*, 17: 9–19.

Blomquist, Glenn C., Karen Blumenschein, and Magnus Johannesson. 2009. "Eliciting Willingness to Pay Without Bias Using Follow-up Certainty Statements: Comparisons Between Probably/Definitely and a 10-Point Certainty Scale." *Environmental and Resource Economics*, 43: 473–502.

Bohanon, Cecil E., John B. Horowitz, and James E. McClure. 2014. "Saying Too Little, Too Late: Public Finance Textbooks and the Excess Burdens of Taxation." *Econ Journal Watch*, 11(3): 277–296.

Bronsteen, John, Christopher Buccafusco, and Jonathan S. Masur. 2012. "Well-Being Analysis vs. Cost-Benefit Analysis." *Duke Law Journal*, 62: 1603.

Champ, Patricia A., and Richard C. Bishop. 2001. "Donation Payment Mechanisms and Contingent Valuation: An Empirical Study of Hypothetical Bias." *Environmental and Resource Economics*, 19: 383–402.

Chilcote, Mark W., Steven A. Leider, and John J. Loch. 1986. "Differential Reproductive Success of Hatchery and Wild Summer-Run Steelhead Under Natural Conditions." *Transactions of the American Fisheries Society*, 115(5): 726–735.

Clark, Bradley T. 2012. "Dam Removal and Restoration on the Elwha River: Does Size Really Matter?"

---

55 http://www.peninsuladailynews.com/news/port-angeles-to-sue-park-service-in-dispute-over-elwha-river-water-facilities/

56 https://www.seattletimes.com/seattle-news/port-angeles-tribe-say-elwha-water-plant-never-worked-still-doesnt/

57 http://www.peninsuladailynews.com/news/national-park-service-denies-port-angeles-claim-on-elwha-water-facilities/

58 https://www.seattletimes.com/life/outdoors/after-the-dams-a-river-of-junk-runs-through-unleashed-elwha/

59 http://wdfw.wa.gov/news/mar3117a/

Corps of Engineers, Seattle District. 2016. Final Environmental Assessment – Ediz Hook Revetment Repairs and Beach Nourishment Activities: FY2016-2026. Available at https://www.nws.usace.army.mil/Portals/27/docs/environmental/resources/2016Environ mentalDocuments/Ediz%20Hook%202016-2026%20Revetment%20Repair%20FONSI_ and_Final_EA.pdf?ver=2016-06-24-180719-883. (accessed January 26, 2019)

Department of the Interior, Department of Commerce, and Lower Elwha S'Klallam Tribe. 1994. *The Elwha Report: Restoration of the Elwha River Ecosystem and Native Anadromous Fisheries.* A Report Submitted Pursuant to Public Law 102-495.

Federal Energy Regulatory Commission. 1993. *Draft Staff Report Volume I: Glines Canyon (FERC No. 588) and Elwha (FERC No. 2683) Hydroelectric Projects.* Washington, DC: Office of Hydropower Licensing.

Gelfenbaum, Guy, Andrew W. Stevens, Ian Miller, Jonathan A. Warrick, Andrea S. Ogston, Emily Eidam. 2015. "Large-Scale Dam Removal on the Elwha River, Washington, USA: Coastal Geomorphic Change." *Geomorphology*, 246: 649–668.

Gowan, Charles, Kurt Stephenson, and Leonard Shabman. 2006. "The Role of Ecosystem Valuation in Environmental Decision Making: Hydropower Relicensing and Dam Removal on the Elwha River." *Ecological Economics*, 56: 508–523.

Howe, Charles W. 1987. "Project Benefits and Costs from National and Regional Viewpoints: Methodological Issues and Case Study of the Colorado-Big Thompson Project." *Natural Resources Journal*, 27: 5–20.

Jorgenson, Dale W., and Kun-Young Yun. 1991. "The Excess Burden of Taxation in the United States." *Journal of Accounting, Auditing & Finance*, 6(4): 487–508.

Kelman, S. 1981. "Cost-Benefit Analysis: An Ethical Critique." *Regulation*, 5: 33–40.

Kosnik, Lea-Rachel. 2006. "Sources of Bureaucratic Delay: A Case Study of FERC Dam Relicensing." *Journal of Law, Economics, and Organization*, 22(1), 258–288.

Kotchen, Matthew, Michael Moore, Frank Lupi, and E.S. Rutherford. 2006. "Environmental Constraints on Hydropower: An Ex Post Benefit-Cost Analysis of Dam Relicensing in Michigan." *Land Economics*, 82(3): 384–403.

Lewis, Lynne, Curtis Bohlen, and Sarah Wilson. 2008. "Dams, Dam Removal, and River Restoration: A Hedonic Property Value Analysis." *Contemporary Economic Policy*, 26: 175–186.

List, John A., and Craig A. Gallet. 2001. "What Experimental Protocol Influence Disparities Between Actual and Hypothetical Stated Values? Evidence from a Meta-Analysis." *Environmental and Resource Economics*, 20: 241–54.

Little, Joseph, and Robert Berrens. 2004. "Explaining Disparities Between Actual and Hypothetical Stated Values: Further Investigation Using Meta-analysis." *Economics Bulletin*, 3(6): 1–13.

Loomis, John B. 1996. "Measuring the Economic Benefits of Removing Dams and Restoring the Elwha River: Results of a Contingent Valuation Survey." *Water Resources Research*, 32(2): 441–447.

Loomis, John B. 2002. "Quantifying Recreation Use Values from Removing Dams and Restoring Free-Flowing Rivers: A Contingent Behavior Travel Cost Demand Model for the Lower Snake River." *Water Resources Research*, 38(6): 1066–1073.

McKean, John, Donn Johnson, and R. Garth Taylor. 2012. "Three Approaches to Time Valuation in Recreation Demand: A Study of the Snake River Recreation Area in Eastern Washington." *Journal of Environmental Management*, 112: 321–329.

McKean, John, Donn Johnson, and R. Garth Taylor. 2010. "Willingness-to-Pay for Steelhead Trout Fishing: Implications of Two-Step Consumer Decisions with Short-Run Endowments." *Water Resources Research*, 46(9): 1–11.

Meyer, Philip A., and Richard Lichtkoppler. 1995. *Elwha River Restoration Project: Economic Analysis – Final Technical Report.* Davis, CA.

Navrud, Stale, and Richard Ready, eds. 2002. *Valuing Cultural Heritage: Applying Environmental Valuation Techniques to Historic Buildings, Monuments and Artifacts*. Northampton, MA: Edward Elgar.

Null, Sarah E., Josue Medellin-Azuara, Alvar Escriva-Bou, Michelle Lent, and Jay Lund. 2014. "Optimizing the Dammed: Water Supply Losses and Fish Habitat Gains from Dam Removal in California." *Journal of Environmental Management*, 136: 121–131.

Office of Management and Budget. 1992. Circular A-94: Guidelines and Discount Rates for Benefit-Cost Analysis of Federal Programs. Available at https://obamawhitehouse. archives.gov/sites/default/files/omb/assets/a94/a094.pdf. (accessed July 20, 2017)

Office of Management and Budget. 2016. *Draft Report to Congress on the Benefits and Costs of Federal Regulations and Agency Compliance with the Unfunded Mandates Reform Act.* Executive Office of the President. Available at https://obamawhitehouse.archives. gov/sites/default/files/omb/assets/legislative_reports/draft_2016_cost_benefit_report_12_ 14_2016_2.pdf. (accessed March 3, 2018)

Pohl, Molly. 2002. "Bringing Down Our Dams: Trends in American Dam Removal Rationales." *Journal of the American Water Resources Association*, 38(6): 1511–1519.

Provencher, Bill, Helen Sarakinos, and Tanya Meyer. 2008. "Does Small Dam Removal Affect Local Property Values? An Empirical Analysis." *Contemporary Economic Policy*, 26(2): 187–197.

Rhodes, Raymon. J., John C. Whitehead, Theodore I. J. Smith, and Michael R. Denson. 2018. "A Benefit-Cost Analysis of a Red Drum Stock Enhancement Program in South Carolina." *Journal of Benefit Cost Analysis*, 2018: 1–19.

Rizzo, Ilde, and Anna Mignosa, eds. 2013. *Handbook on the Economics of Cultural Heritage*. Northampton, MA: Edward Elgar.

Robbins, Jesse, and Lynne Lewis. 2008. "Demolish It and They Will Come: Estimating the Economic Impacts of Restoring a Recreational Fishery." *Journal of the American Water Resources Association*, 44(6): 1488–1499.

Stratus Consulting. 2015. Economic Valuation of Restoration Actions for Salmon and Forests and Associated Wildlife in and Along the Elwha River. Available at http://www.habitat. noaa.gov/pdf/Economic_Valuation_of_Restoration_Actions_for_Salmon_and_Forests_ and_Associated_Wildlife_in_the_Elwha_River.pdf. (accessed October 1, 2017)

Washington Department of Fish and Wildlife. 2017. Extension of Recreational and Commercial Fishing Closure Announced for Elwha River and Its Tributaries. Available at http:// wdfw.wa.gov/news/mar3117a/. (accessed July 25, 2017)

Onil Banerjee* , Martin Cicowiez and Adela Moreda

Evaluating the Economic Viability of Public Investments in Tourism

Abstract: Various methods have been applied to evaluating the economic viability of public investments in tourism. In this article, we capitalize on the strengths of computable general equilibrium and cost-benefit analytical techniques and develop an integrated approach to evaluating public investments in tourism. We apply the approach to the evaluation of a US$6.25 million investment in tourism in Uruguay from the perspective of a multilateral development bank and a beneficiary government. These perspectives differ in a cost-benefit analysis (CBA) due to the timing of the costs incurred. The integrated approach is powerful in that it captures first and subsequent rounds of investment impacts of benefits and costs; resource diversion and constraints are accounted for, and the estimation of benefits is consistent with the welfare economics underpinnings of CBA.

Keywords: cost-benefit analysis; dynamic computable general equilibrium model; ex ante economic impact analysis; public investment analysis; tourism; Uruguay; welfare economics.

JEL Classifications: Z3; C68; D61; O1; O2; O5

1 Introduction

The most appropriate methods and metrics for evaluating the economic viability of public investments in tourism and their relative strengths and limitations have been subject to discussion in the literature (Burgan & Mules, 2001; Dwyer et al., 2003; Layman, 2004; Blake, 2005; Abelson, 2011; Dwyer et al., 2016). Carefully defined

―――――
*Corresponding author: Onil Banerjee, Environment, Rural Development, Environment, and Disaster Risk Management Division, Inter-American Development Bank,1300 New York Avenue N.W., Washington, DC 20577, USA, e-mail: onilb@iadb.org
Martin Cicowiez: Facultad de Ciencias Económicas, Universidad Nacional de la Plata, Calle 6 Entre 47 y 48, 3er Piso, Oficina 312, 1900 La Plata, Argentina
Adela Moreda: Environment, Rural Development, Environment, and Disaster Risk Management Division, Inter-American Development Bank,1300 New York Avenue N.W., Washington, DC 20577, USA

public investment objectives are critical for determining the appropriate choice of method and metric. The main analytical techniques available include input-output modeling, computable general equilibrium (CGE) modeling, cost-benefit analysis (CBA), expenditure-based methods, and benefit scoring. The metrics used to represent benefits include gross domestic or gross regional product, net household income or consumption, employment, and welfare measures such as consumer surplus, producer surplus, and equivalent variation (EV).

This article contributes to the literature on public investment impact analysis in two ways. First, we capitalize on the strengths of two well-established analytical approaches, CGE and CBA, and develop a rigorous and integrated approach to evaluating public investments in tourism. This analysis may be undertaken from the perspective of a multilateral development bank and from the perspective of a beneficiary government. These perspectives differ in a CBA due to the timing of when costs are considered to be incurred. Second, in considering the beneficiary government's perspective, we build-in the repayment of a concessional loan extended by a multilateral development bank to finance the investment in a temporally dynamic modeling framework. To illustrate the approach, we estimate the economic and welfare impacts of a US$6.25 million public investment in tourism in Uruguay from both the multilateral development bank and beneficiary government's perspectives.

Tourism is important for Uruguay's economy, representing 8.6 % of gross domestic product (GDP) in 2017 and generating 114,287 jobs which is approximately 6.3 % of total employment (Ministerio de Turismo, 2018). Tourism's contribution to GDP has been on the rise since 2014 and is expected to continue to grow by 4.0 % per year until 2028 (WTTC, 2019). In 2018, Uruguay received 3.7 million tourists with 28 % visiting the capital Montevideo as their primary destination and 20 % visiting the sun and sand destination of Punta del Este. Tourism expenditure was over US$2.0 billion, with 41 % of this expenditure taking place in Punta del Este and 28 % in Montevideo (Ministerio de Turismo, 2018, 2019). This geographical concentration of tourism is one of the motives for the investment loan analyzed in this article, which aims to geographically diversify the tourism opportunities in the country. The Uruguay River Corridor was selected specifically for its potential for enhancing nautical tourism as well as ecological tourism and cultural tourism opportunities (Moreda et al., 2017). Figure 1 presents a map of Uruguay and the Uruguay River.

This article is organized as follows: Section 2 provides a literature review of CGE and CBA, and details of the methods. Section 3 discusses the integration of CGE with CBA. Section 4 presents the analytical approach, scenario design, results, and analysis. Section 5 provides a discussion and the conclusions of the article.

Figure 1 Map of Uruguay.

2 Overview of the literature

2.1 CGE analysis

In the analysis of large public investments or policies that are expected to impact multiple sectors and actors in an economy with dynamic effects, a dynamic CGE approach is powerful. CGE analysis captures important intersectoral, and back-ward and forward linkages, and the direct, indirect, and induced benefits of

an investment (Cattaneo, 2002; Dixon & Rimmer, 2002; Dwyer et al., 2003; Dwyer et al., 2005; Banerjee et al., 2015). Pearce et al. (2006) suggest that where projects are large and complex, partial equilibrium frameworks are seldom sufficient and that the analytical framework should be capable of considering a wide range of impacts on all sectors that may be impacted. All project spillovers and indirect costs and benefits should be accounted for. A core strength of the CGE approach is its meticulous detail in appraising spillovers of an intervention (Pearce et al., 2006).

Ex ante economic impact analysis with CGE models has been applied to public investments in the forestry (Banerjee & Alavalapati, 2014; Banerjee et al., 2016a, 2019) and tourism sectors (Taylor, 2010; Taylor & Filipski, 2014; UNWTO, 2014; Banerjee et al., 2015, 2016b, 2018). Indeed, CGE analysis can be applied across a broad range of economic sectors where large public investments are concerned and intersectoral linkages are important. Beyond consideration of economic impacts of public investments, CGE models have a long history in applied policy analysis, from fiscal to trade to environmental policy analysis, with CGE models distinguishing themselves as the "workhorse" of policy analysis (Jones, 1965; Dixon et al., 1992; Dixon & Jorgenson, 2012). As Nobel Economist Kenneth J. Arrow stated: "…in all cases where the repercussions of proposed policies are widespread, there is no real alternative to CGE" (Arrow, 2005, p. 13).

CGE models are mathematical models that consist of systems of equations, which describe the relationships between sectors, agents, and other accounts in the underlying Social Accounting Matrix (SAM). CGE models are based on SAMs for a country, region, or for all countries linked together through trade as in the Global Trade Analysis Project database (Aguiar et al., 2016). A SAM provides a snapshot of an economy describing all monetary transactions between economic sectors and its agents, including households, government and enterprises, and the relationships between the modeled economy and other countries or regions of the world (King, 1985; Pyatt & Round, 1985).

A SAM is constructed based on a country's System of National Accounts (European Commission et al., 2009) including integrated economic accounts, fiscal accounts and balance of payments data, and often government survey data such as household income and expenditure surveys. Recently, with the publication of the first international standard for environmental statistics, the System of Environmental-Economic Accounting Central Framework (European Commission et al., 2012), it has become possible to integrate detailed environmental information into CGE models. The development of the Integrated Economic-Environmental Modelling (IEEM) Platform has important applications for tourism investment analysis where tourism demand is a function of natural capital stocks and environmental quality (Banerjee et al., 2016c, 2019b).

CGE models are commonly used to assess economic impact and as such, some of the key indicators reported are GDP or gross regional product. As policy makers are frequently concerned with household income, consumption, and employment, these metrics are also often reported. In developing country contexts, indicators of poverty and inequality are frequently of interest, although disaggregation of households is necessary to generate meaningful results.

Indicators of changes in household welfare measured by compensating and EV may also be estimated in a CGE framework (Lofgren et al., 2002). Where an intervention does not occur, EV is the amount of income an individual would have to be given to make them as well off (i.e., with the same level of utility) if the intervention did not take place.

Of course, where trade and fiscal policy shocks are the subject of analysis, impacts on exports, imports, the exchange rate, and levels of tax revenue become more relevant. With detailed representation of the environment in integrated modeling frameworks such as the IEEM Platform, measures of wealth such as genuine savings and inclusive wealth may also be reported (Stiglitz et al., 2010; Arrow et al., 2012; Banerjee et al., 2019c).

2.1.1 Dynamic CGE model methods

Our CGE model combines a relatively standard recursive dynamic CGE model (see, for example, Robinson, 1989; Lofgren et al., 2002), with additional equations and variables that can single out (i) domestic and foreign tourism demand; (ii) different modalities of tourism supply and demand; and (iii) the impact of public capital investment in infrastructure on sectoral productivity.[1] Supplementary Information for this article presents a non-technical overview mathematical statement of our model. Compared to other CGE models, this model combines policy-relevant features for the study of tourism investment or policy counterfactual scenarios in an economy.

The major building blocks of a CGE model may be organized into activities which produce goods and services, markets for goods and services, markets for factors of production (labor, capital, land, and other natural resources), and three institutions, namely households, government, the rest of the world, and foreign tourists (Figure 2).

Activities produce goods and services, and sell their output at home or abroad and use their revenues to cover their costs of intermediate inputs, factor costs, taxes, and transfer what remains to investors as investment returns. Profit maximization drives firm decisions on levels of activity and factor use. Output of goods and services are exported and sold domestically depending on the relative prices of the output in world

---

1 For additional resources on CGE modeling and methods, see Banerjee et al. (2018), Burfisher (2017), Dixon and Jorgenson (2012), Dixon et al. (1992), Dixon and Rimmer (2002), and Lofgren et al. (2002).
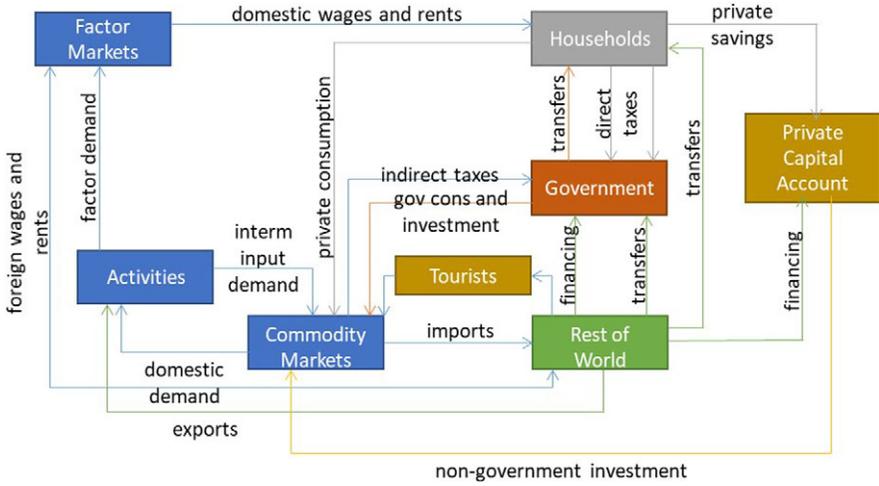
Figure 2 Circular income flow in the CGE.

and national markets. For any exported commodity, exporters face either (i) export prices (free on board prices) that are exogenously determined, in which case export demand is infinitely price-elastic; or (ii) price-sensitive export demands which are defined by constant-elasticity functions with the free on board export prices linked to domestic conditions including the costs of production and the real exchange rate.

Households earn incomes from factors and transfers, which are used for consumption, direct taxes, and savings. Household consumption decisions vary in response to income and price changes. The household budget constraint ensures that the consumption value of the households equals their income net of direct taxes and savings.

The government receives receipts from taxes and transfers and uses these for consumption, transfers to households and investment. The government draws on the loanable funds market for supplementary funding, which is the case of the public investment in tourism considered in this article. To remain within its budget constraint, the government either adjusts its spending on the basis of available receipts or mobilizes additional sources of income through increasing taxes or foreign borrowing.

The rest of the world sends foreign currency to the modeled country in the form of transfers to its government and households, which in turn use these inflows to finance its imports. It is assumed that the balance of payments clears through adjustments in the real exchange rate, influencing export and import quantities and values in foreign currency. The private capital account provides investment financing from savings by households and the rest of the world, net of government financing.

Tourism demand from the rest of the world is modeled as an exogenous volume. In turn, total tourism demand is disaggregated across locally produced commodities using fixed coefficients. In the CGE model applied in this study, only foreign tourists are singled out. To do so in the SAM, an institution is added which represents foreign tourist expenditure in Uruguay. It is assumed that foreign tourists have a consumption basket that is based on fixed shares.

In domestic commodity markets, flexible prices ensure balance between demand and supply. Import prices in most cases would be exogenous, but the assumptions of the model can be adjusted for cases where import prices are endogenous. The share of imports in the national market is determined by import product prices relative to domestically produced product prices.

In factor markets, demand curves are downward-sloping reflecting the responses of production activities to changes in factor prices. In the case of labor, unemployment is endogenous. For each labor type, the model assumes an inverse relationship between the real wage and the unemployment rate (Blanchflower & Oswald, 1994, 2004). The model allows for different assumptions on labor mobility in response to wage differentials between the country and the rest of the world. For non-labor factors, the supply curves are vertical in any single year, that is, their quantity is fixed, but price adjusts according to the level of demand.

In our CGE, national income growth over time is endogenous. The economy grows due to the expansion of capacity determined by net fixed capital formation and labor availability as well as improvements in total factor productivity. The accumulation of private and government capital is through investment financed by local and external savings. Increased private capital is allocated across sectors according to their relative profitability. Once installed, capital becomes sector-specific and can only by adjusted through exogenously determined depreciation and the attraction of new investments.

2.2 CBA

The origins of CBA may be traced back to an application by U.S. Federal Water Agencies as early as 1808 where CBA was applied to evaluate the alternative use of public funds from an economy-wide perspective (Mishan, 1988; Burgan & Mules, 2001). Hanley and Spash (1993) and Pearce et al. (2006) provide a brief history of the development of CBA. CBA is theoretically grounded in welfare economics where benefits are defined as increases in well-being or utility and costs are defined as reductions in utility. Thus, for an intervention to be welfare enhancing, the with-project social benefits must outweigh the social costs within a predefined geographic area.

There are two main aggregation rules that are often applied in CBA in estimating net impacts of an intervention. The first rule sums the willingness-to-pay for estimated benefits or the willingness-to-accept compensation for loss of benefits across a defined population. Willingness-to-pay and willingness-to-accept are at the core of welfare economics and correspond to compensating and EV. The second aggregation rule is applied in cases where it is appropriate to place a higher weight on the benefits or costs faced by different segments of the population such as the poor and more marginalized groups in society (Pearce et al., 2006).

In applying CBA, the benefits accruing to a predefined population are estimated. When the population comprises several individuals or households, the benefits that would accrue to each household need to be aggregated to represent the overall benefits to the population. In other words, one needs to aggregate the individual impacts into a single impact. In doing so, different weighting schemes may be used to represent how the analyst assumes benefits will be distributed.

2.2.1 CBA methods

Following Hanley and Spash (1993), CBA is conducted in seven main steps. The first step defines the project, identifies the resources to be used and for what purpose, and identifies the population expected to be affected by the intervention. The second step identifies project impacts where all resources used in the project including raw materials, capital, labor, land, and other resources are accounted for. The nature of the impacts will differ from project to project, although these impacts can range from impacts on income, output, prices, wages, and property value, to changes in environmental quality. Two important concepts in the identification of impacts are additionality and displacement. Additionality takes into consideration the marginal impact of the intervention while displacement is concerned with the reallocation of resources from an existing use, to the new intervention. Both concepts are critical in how results of the analysis are presented and interpreted.

The third step involves judgment on selection of the impacts that are economically relevant. With welfare economics underpinning CBA, the goal is to maximize a social welfare function. This function is estimated as the weighted sum of the utility of each individual in the population. In this context, utility is understood as the value of the consumption of marketed and non-marketed goods and services. A CBA should provide a decision rule for policy makers, enabling them to select the intervention that provides the greatest social utility.

The fourth step involves physical quantification of the economically relevant impacts while the fifth step is the monetary valuation of these impacts. Ascribing a monetary value to non-market goods can be challenging, although methods for

doing so are continually becoming more robust. These methods are categorized as revealed preferences and stated preferences. Revealed preferences include direct methods such as damage cost and replacement cost, and indirect methods such as hedonic and random utility approaches (Pearce et al., 2006). Stated preference approaches include contingent valuation and choice modeling; these stated preference methods are the primary approach for estimating non-use values (Champ et al., 2003; Pearce et al., 2006; Johnston et al., 2017). Where ascribing a monetary value to non-market goods and services is not feasible or desirable, economic measures may be supplemented by biophysical ones (Stiglitz et al., 2010; Polasky et al., 2015).

The sixth step of the analysis applies the net present value (NPV) test, which assesses whether the sum of discounted benefits exceeds the sum of discounted costs. If the result is positive, the intervention is considered an efficient allocation of resources. Calculation of NPV involves making a decision on the rate of time preference or discount rate, and discounting the flow of costs and benefits, converting all values to present value terms.[2] This calculation is shown in Equation (1).

$$\mathrm{NPV} = -I_0 + \frac{C_1}{1+r} + \frac{C_2}{(1+r)^2} + \cdots + \frac{C_T}{(1+r)^T}, \tag{1}$$

where NPV is net present value, I_0 is the initial investment, T is the final year of the period of analysis, C is the cash flow, and r is the discount rate.

The seventh and last step in a CBA is to undertake sensitivity analysis to assess which parameters have the strongest effect on NPV. Usually, the parameters tested in the sensitivity analysis are the physical quantities and qualities of inputs and outputs, prices, and in some cases, the discount rate and project time horizon.

3. Integration of CGE and CBA

Public investment in tourism can be motivated by the impact the investment is expected to have on income and employment, which are enhanced by increased tourism expenditure in a region. In developing country contexts, reducing poverty and inequality as well as reducing regional disparities can also drive public investment. Government investments may also be directed to correcting market failures when individual tourism sector firms are unable to capture the share of tourist

---

[2] There is a long-standing debate in the literature on the appropriate discount rate for different types of interventions. In this article, we use the standard discount rate applied by the Inter-American Development Bank in all its projects.

expenditure that is commensurate with their expenditures and promotional, and organizational efforts (Burgan & Mules, 2001). Where investment is justified based on its expected benefits, it is important to define benefits precisely.

From a CBA perspective, benefits equate with welfare and the net benefit is the change in welfare, net of the real resource costs. Defining benefits as increases in tourist expenditure and evaluating these in a CBA would not be consistent with the welfare economics foundation of CBA. In an economic impact assessment framework, evaluation of the economic benefits in terms of tourism expenditure or regional product may be appropriate, although these indicators are not valid measures of benefits from a welfare economics standpoint.

As discussed in Dwyer et al. (2016) and Abelson (2011), while an investment with a positive impact on GDP may be welfare enhancing, GDP alone suffers from a number of limitations as a measure of welfare. GDP measures the value of all economic output. From the income approach to calculating GDP, this includes the income earned by non-resident owners of capital and non-resident labor and as such, accounts for benefits that accrue outside of the region of interest. Second, interpreted from the expenditure approach to calculating GDP, an increase in GDP can be driven by measures to mitigate additional reductions in welfare. For example, expenditure to clean up an oil spill or remove plastic waste from oceans would be recorded as positive contributions to GDP. Furthermore, while GDP captures income or expenditure flows, it does not provide indications of the sustainability of these flows (Stiglitz et al., 2010; Lange et al., 2018).

In a partial equilibrium framework, to be compatible with the welfare underpinnings of CBA, the appropriate metrics of benefits are consumer or producer surplus. In the case of tourism, however, and particularly when enhancing foreign tourism expenditure is the aim, consumer surplus is not the appropriate indicator of welfare since the consumer is a foreign visitor. Although enhancing the foreign visitor experience is important for increasing tourism revenue, the Government's primary policy objective will be to improve the welfare of its constituents and thus the benefits that accrue to residents of their jurisdiction, rather than the benefits perceived by individuals residing elsewhere. In a partial equilibrium framework, the relevant metric for welfare from a public policy standpoint is producer surplus where benefits to the economy are assessed as a function of increases in local production (Burgan & Mules, 2001).

A general equilibrium framework enables consideration of public policy and investment on households. In this framework, household welfare or utility is the appropriate measure of benefits and is readily estimated in a CGE framework (Hanley & Spash, 1993; Blake, 2005; Pearce et al., 2006; Dwyer et al., 2016). As pointed out by Dwyer et al. (2016), EV translates an estimate of economic impact into a welfare measure based on assumptions made with respect to factor mobility and constraints.

The CGE approach has additional advantages over partial equilibrium frameworks since the impacts of second and subsequent rounds of direct, indirect, and induced impacts generated by an investment are also captured. Furthermore, the CGE approach affords a level of internal consistency not possible in a partial equilibrium framework by balancing supply and demand for goods, services, savings, and investment and factors, subject to resource constraints.

Model assumptions on factor mobility and constraints are important considerations in interpreting net benefits estimated through a general equilibrium and a conventional partial equilibrium CBA approach. In a general equilibrium setting, if labor and capital are diverted from an existing use to a new intervention, the net benefit would only be positive if the new use generated greater welfare. A partial equilibrium approach, however, would not account for this resource diversion and thus could lead to an overestimation of net benefits. The use of estimates of welfare impacts generated through a general equilibrium approach in a CBA overcomes this limitation. This the method developed in the section that follows.

Another important consideration in both a general equilibrium and CBA framework is the opportunity cost of labor. When the opportunity cost of labor is equal to zero, the social benefit of an additional job is the wage paid to the new salaried worker. Where unemployment exists and the opportunity cost (i.e., the unemployed workers' reservation price) is less than the minimum wage, the benefit of the additional job is the difference between the minimum wage and the worker's reservation price (Bartik, 2012). In areas with high unemployment, few social safety nets and where labor is mobile between sectors and regions, it may be reasonable to assume that the opportunity cost of the unemployed worker is very close to zero. In developing country contexts, this is often the case.

Layman (2004) argues that for the results of general equilibrium analysis to provide meaningful information to policy makers, a recognized set of methods, assumptions, and indicators are required. For example, any additional resources used in an intervention should be accounted for and the costs associated should be deducted from gross product (Hanley & Spash, 1993; Layman, 2004). Indeed, one of the strengths of the CGE approach is that it is an internally consistent framework providing a strict accounting of all market costs and benefits generated by an intervention. With increasing experience in applying CGE to public investment analysis, methods, assumptions, and indicators are becoming increasingly standardized (UNWTO, 2014; Banerjee et al., 2018; Banerjee & Cicowiez, 2019).

Although CBA has a long history of incorporating non-market benefits in the analysis, recent efforts have improved non-market considerations in CGE analysis. Integration of non-market benefits can be achieved through the use of outputs from specialist models in a CGE and through linking different specialist models with CGE. For example, Dixon et al. (2017) use the outputs of a highway investment

model to estimate impacts of increasing highway expenditures. The Highway Economic Requirements System model was used to estimate impacts on vehicle operating costs, travel time, and other key variables, which were later used in a CGE model to derive results for indicators such as GDP, employment, and welfare. Other work by Banerjee et al. (2019a) links the IEEM Platform with ecosystem services modeling (IEEM + ESM), which enables the estimation of the contribution of ecosystem services to economic outcomes. For example, Banerjee et al. (2019a) estimate how changes to erosion mitigation ecosystem services affect agricultural and livestock productivity, which in turn impact the overall level of economic output and growth.

4 Integration of CGE and CBA: An application to Uruguay

This section applies a CGE approach to assessing the impacts of a public investment in tourism in Uruguay and uses the results in a CBA framework. The CBA is presented from the perspective of a multilateral development bank and from the perspective of the beneficiary government. From the development bank's perspective, on the cost side, what is of concern is the disbursement schedule of the loan. On the benefit side, the development bank is interested in increasing net social benefits for the borrowing country. From the perspective of the borrowing country, on the cost side, the government is concerned with the repayment schedule of the loan. On the benefits side, as with the development bank, the government also seeks to maximize the net social benefits accruing to its citizens. Based on the discussion above, and since we are concerned with changes in welfare of the citizens of the borrowing country, EV is the appropriate measure of welfare and it is the indicator used in the CBA.

The CGE model developed in Banerjee et al. (2015, 2016b) and described in subsection 2.1.1 is calibrated with a new SAM for Uruguay with a base year of 2013 (Cicowiez, 2016). The CGE is applied to the ex ante economic analysis of a US$6.25 million public investment in tourism. This investment is supporting tourism development in the Uruguay River Corridor to create employment and income in emerging destinations and consolidate tourism opportunities to improve regional equity.

The three main objectives of the investment are to (i) create and consolidate tourism infrastructure (US$3.555 million); (ii) catalyze private sector investment in the corridor (US$950,000); and (iii) strengthen regional tourism governance (US$900,000). Operations and maintenance of new infrastructure is estimated at an annual cost of 3 % of the value of this infrastructure. Management costs of the tourism program are accounted for during the first 5 years and total US$845,000.
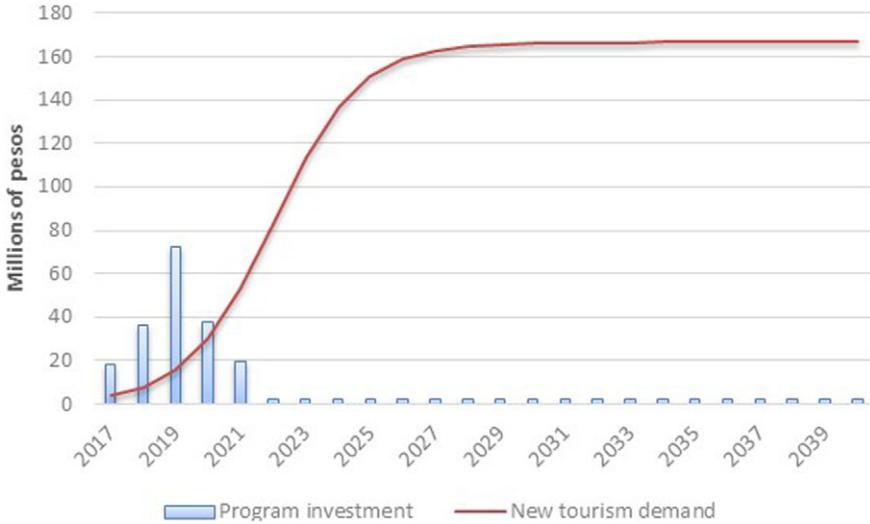
Figure 3 Distribution of investment costs and projected tourism demand increase.

This amount is applied proportional to the amount of infrastructure investment in the first 5 years. Figure 3 describes the distribution of the investment and operations, and maintenance costs until 2045, which is the time horizon used in this analysis.

Table 1 describes the accounts in the Uruguay SAM. The SAM developed was extended to disaggregate foreign tourism demand.

According to the SAM, Uruguay's GDP reached 1,140,989 million pesos in 2013. Uruguay imported 75,958 million pesos more than it exported, while foreign tourism demand directly contributed to almost 3.4 % of GDP (Table 2).[3]

The sectoral structure of Uruguay's economy is depicted in Figure 4. The Other services sector is the largest sector accounting for 38 % of the economy's value added. Commerce is a far second followed by Construction, and then Agriculture, forestry, and fisheries. Although not shown here, Processed food and Agriculture, forestry, and fisheries lead Uruguay's exports (35 % and 28 %, respectively). The Manufacturing and the Mining, petroleum, and chemicals sectors account for the greatest share of imports.

4.1 Scenario design

The following five scenarios were undertaken: (i) the baseline scenario that is the *without investment* scenario (baseline). This is the baseline to which all other

---

[3] Exchange rate used: 28.25 pesos to US$ 1 (January 2017).

Table 1 Main accounts in the Uruguay SAM.

Category	Item	Category	Item
Sectors 12	Agriculture, forestry, and fishing	Factors continued	Land
	Processed food		Timber resources
	Manufacturing		Fisheries resources
	Utilities		Mining resources
	Mining, petroleum, chemicals	Institutions 3	Households
	Construction		Government
	Commerce		Rest of the world
	Hotel and restaurant	Taxes 9	Unskilled labor factor tax
	Transportation		Skilled labor factor tax
	Communications		Capital factor tax
	Public administration		Natural resources factor tax
	Other services		Import and export duties
Factors 11	Salaried labor, low skill		Direct taxes
	Salaried labor, mid skill		Activity taxes
	Salaried labor, high skill		Other taxes
	Non-salaried labor, low skill		Social security contributions
	Non-salaried labor, mid skill	Investment 3	Private investment
	Non-salaried labor, high skill		Government transport infra investment
	Capital		Other government investment

Table 2 Uruguay, 2013, total supply and demand.

Item	Millions of pesos
Demand	
Private consumption	751,198
Government consumption	157,987
Fixed investment	261,421
Exports	235,238
Tourism demand	38,642
Total demand	1,444,487
Supply	
GDP	1,140,989
Imports	311,197
Stock change	7,698
Total supply	1,444,487

scenarios are compared; (ii) the investment scenario where the government investment in tourism infrastructure, institutional strengthening, and capacity building is implemented (invest); (iii) the demand scenario, which simulates the projected increase in foreign overnight leisure tourism expenditure arising from the investment (demand); (iv) a combination scenario where the investment and demand scenarios
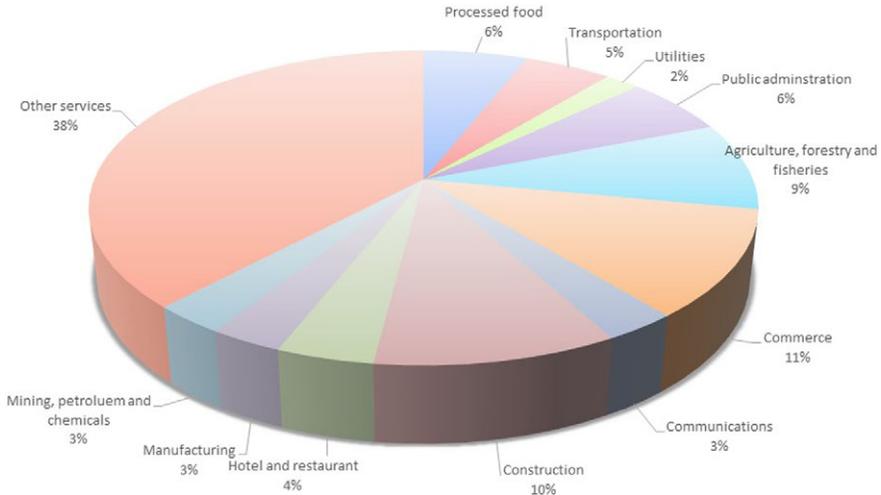
Figure 4 Sector structure in 2013, value added shares.

are implemented jointly (combi); and (v) a final scenario, which is the combi scenario with the internalization of the repayment of the US$6.25 loan in the CGE simulation (combi-pay). Details of each scenario are as follows.

4.1.1 Baseline scenario

This baseline scenario assumes that average past trends will continue from 2014 to 2045. The non-base scenarios that follow only deviate from the baseline scenario beginning in 2017.

4.1.2 Invest scenario

The invest scenario imposes increased government investment in tourism infrastructure, institutional strengthening, and capacity building financed through a multilateral development loan. The investment schedule is shown in Figure 3. The year 2017 is the first year of the investment, which continues until 2021, inclusive. The investment itself includes technical studies; interpretive touristic circuits; investments in enhancing cultural and ecological assets, and visitor's centers; a tourism statistics, information and marketing system; and tourist operator capacity building and a local competitive tourism development fund. Figure 3 also shows annual operations and maintenance costs of new infrastructure (3 % of the value of new infrastructure per year) as well as infrastructure management costs equal to US$845,000 annually (Moreda et al., 2017).

The investment enters the CGE model from the rest of the world as foreign financing to the government (Figure 2), which is in turn used for the purchase of goods and services according to the composition of the investment.

4.1.3 Demand scenario

In the demand scenario, foreign leisure overnight tourist arrivals and expenditure are projected to increase as a result of the increased tourism opportunities created by the investment. With program tourism demand was estimated in Eugenio-Martin and Inchausti-Sintes (2016) with econometric regression analysis. In this regression, the economic value of the presence of an additional tourism attraction was estimated using tourism expenditure as the independent variable. The three attractions considered were nautical tourism, ecotourism, and cultural tourism attractions.

Based on the characteristics and number of new attractions to be developed through the investment, the total additional tourism expenditure was estimated at over 166 million pesos. This increased tourism demand was distributed according to a logistical functional form, which represents a gradual increase over time until the point of inflection after which growth in tourism demand attributable to the investment begins to slow. This increase in growth is applied over a 14-year period such that the new tourism demand reaches 50 % in year 2022 and 100 % in 2030 (Figure 3).

4.1.4 Combi scenario

The combi scenario models the invest and demand scenarios combined.

4.1.5 Combi-pay scenario

The combi-pay scenario models the invest and demand scenarios combined and internalizes the repayment of the US$6.25 million loan in the CGE model. According to conditions applied to similar multilateral loans, repayment begins after a grace period in year 7, which is year 2023 in this analysis. Interest owing and the principal payment are made annually with the final payment made in 2039. The interest rate used is 1.58 % and is based on the US Dollar LIBOR.[4] The value of the repayment is held constant over the period and is equivalent to 11.85 million Uruguayan pesos.

To finance repayment of the loan, the household income tax rate is adjusted to generate the necessary funds. The mechanics of this repayment in the CGE are as

---

4 LIBOR rate retrieved on October 28, 2016.

follows. In the dataset and CGE, there is a single representative household. In order to clear the government budget, the household income tax rate scales up or down endogenously to generate sufficient government revenue to finance its expenditure.

Model closure rules are required to determine the mechanisms by which demand and supply are equalized in all markets. In this analysis, government consumption is kept as an exogenous variable and is not adjusted to balance the budget. Instead, in non-base scenarios, government foreign borrowing is adjusted to finance the public investment in tourism. That is, the government borrows from the rest of the world to finance the increase in public investment, which is consistent with a situation in which a country borrows capital from a multilateral development bank. Private investment is savings-driven. Foreign borrowing to finance the non-government capital account is kept fixed at its baseline value expressed in foreign currency units. The real exchange rate balances the current account of the balance of payments.

In the case of labor, unemployment is modeled with a wage curve calibrated using recent estimates for the elasticity of wages with respect to the unemployment rate; specifically, its value is -0.1 (Anaya & Rodríguez-Villamil, 2012). For capital, we assume that once installed, capital is immobile and cannot move to different sectors. This assumption was made to reflect that capital differs according to the sector that uses it. The consumer price index is the numeraire.

In addition to model closure rules, elasticities and other free parameters also influence the results of CGE simulations. Elasticities inherently have an estimation error. To understand the implications of this estimation error, systematic sensitivity analysis was conducted to evaluate the robustness of the results with respect to model elasticities. Detailed results of this analysis are presented in the Appendix.

4.2 CGE model results and analysis

Figure 5 illustrates impacts on household welfare measured by EV in millions of pesos. EV represents the amount of income an individual would have to be given to make them as well off (i.e., with the same level of utility) as they would be if the intervention did take place. In the invest scenario, EV spikes with the disbursements of the loan reaching a maximum in 2019. After 2019, EV falls toward baseline levels and dips below the baseline in 2022. During the 5-year period in which the public investment is implemented, there is a temporary crowding out of private investment due to increase capital costs, which has a negative impact on EV. At the same time, increased economic activity generates greater household income and savings, which results a net positive impact on EV.

The impact on EV in the demand scenario closely follows the increase in projected demand from the creation of new tourism attractions and opportunities.
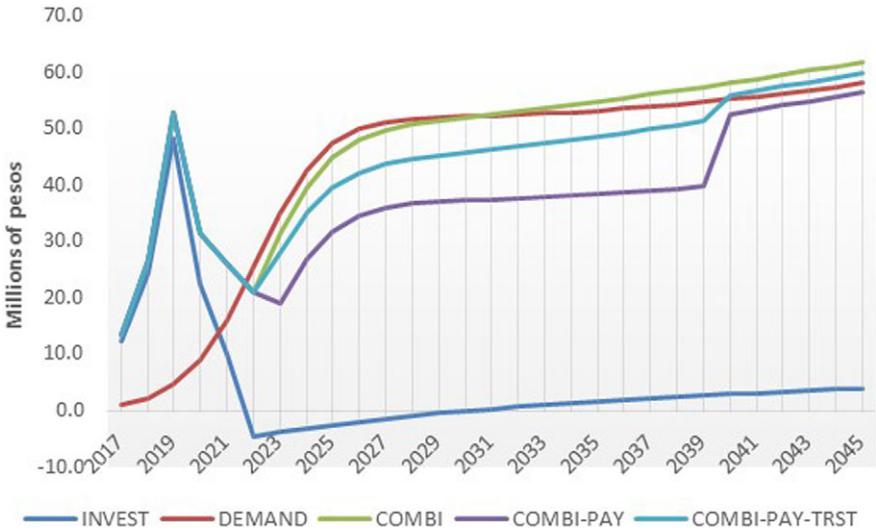
Figure 5 Impact on equivalent variation, deviation from baseline, millions of pesos.

This increase in EV is driven by a reduction of unemployment and an appreciation of the real exchange rate, which also has a positive effect on household consumption, making imported goods relatively cheaper. The combi scenario is the joint impact of the invest and demand scenarios. The contribution of the demand scenario offsets the small negative impact that was perceived in the invest scenario around 2022 and the trend is positive throughout the period of analysis. By 2045, EV is an additional 60 million pesos above baseline levels.

The combi-pay scenario follows a similar trend as the combi scenario, although the combi-pay trend is between 5 and 15 million pesos lower than the combi scenario during the loan repayment period. EV in combi-pay remains lower due to the higher direct tax rate and corresponding lower savings. As a result of the higher direct tax rate and lower savings, private capital stock decreases relative to the combi scenario during the loan repayment period. Household income tax differs between combi-pay and combi by 0.000927 % in 2023 and falls slowly until 2039 after which most of the loan is repaid (Figure 6). From 2040 onward, the household tax rate adjusts back downward to 0.00091 %, remaining relatively stable thereafter. These small adjustments in the tax rate are consistent with the size of the loan relative to the size of the Uruguayan economy and tax base.

In combi-pay, EV spikes upward in 2039 once the loan is repaid, although remains below combi levels due to the forgone increase in capital stock resulting from loan repayment. In 2045, the difference between the combi and the combi-pay
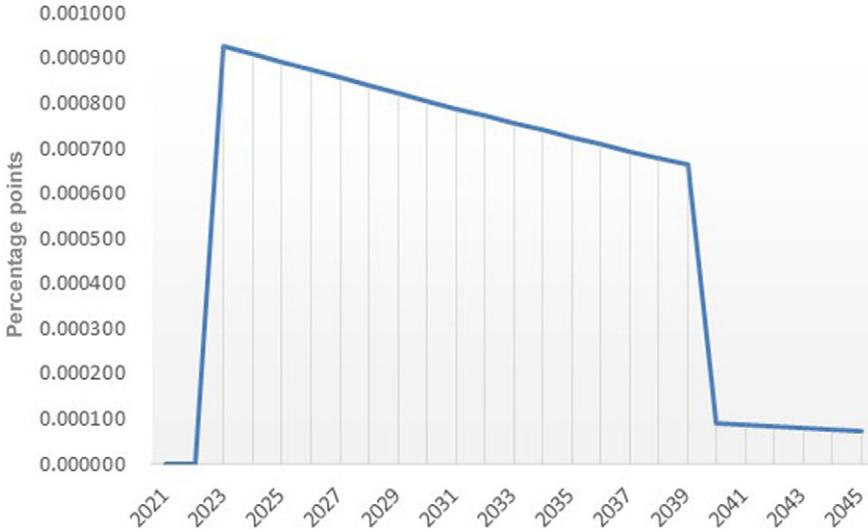
Figure 6 Difference from baseline in household tax rate, percentage points.

scenario is 5.3 million pesos. The cumulative difference in EV between the combi and combi-pay scenario by 2045 is almost 289 million pesos.

As discussed in subsection 4.1, model elasticities influence the results of CGE analysis. To understand the implications of inherent elasticity estimation errors, systematic sensitivity analysis was conducted (Appendix). Results of this analysis confirm the robustness of the results presented here showing that in the case of the combi scenario, there is virtual certainty that household welfare would increase with the public investment in tourism.

Figure 7 shows how key macroeconomic variables evolve over time in the combi scenario. Exports (which exclude foreign tourism spending) are below baseline levels due to slightly reduced output from export sectors. This is also the consequence of the real exchange rate appreciation. In fact, the tradable sector suffers a kind of Dutch disease due to the increase in the spending of foreign tourists. The exchange rate appreciation enables households to consume more imports. Wages, private consumption, government investment, and GDP are all above baseline levels in combi. GDP in 2045 is 55 million pesos above the baseline. Although not shown here, private fixed investment is lower than the baseline during the public investment stimulus. This is the result of a temporary crowding-out effect that is caused by the increase in public investment and the consequent increase in the price of capital goods, which is a feature that has been identified in similar analysis (Dwyer et al., 2005; Banerjee et al., 2016b).
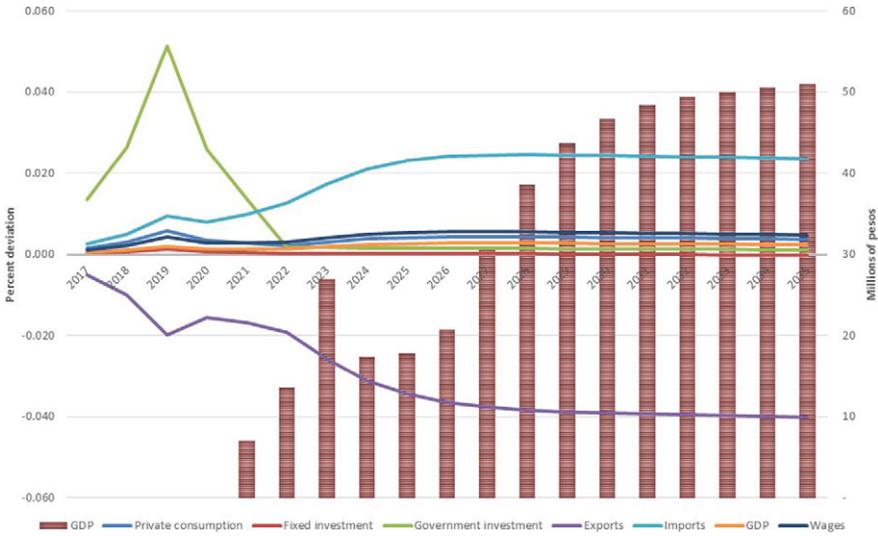
Figure 7 Evolution of macroeconomic indicators in present deviation from base (left axis) and millions of pesos (right axis).

In terms of sectoral results, the Hotel and restaurant sector is strongly stimulated by 98 million pesos by 2035 relative to the baseline (Figure 8). Other gainers are the Transportation sector and Other services sector. Some sectors contract in response to the investment and these are primarily comprised of the Agricultural sector, followed by the Processed food and Manufacturing sectors. Reduced output from these sectors contributes to the slower growth in Uruguayan exports arising from the public investment. It is important to note that much of these changes are small, although consistent with the size of the investment shock.

Finally, an alternative approach to financing the repayment of the loan is considered. Although combi-pay adjusts the household tax rate to finance loan repayment, we consider instead a levy of a new tourist tax to collect the additional resources for loan repayment. Results show that taxing foreign tourism dampens the impact repayment has in the combi-pay scenario where repayment is financed through taxing household income (see COMBI-PAY-TRST in Figure 5). The tourist tax is on average 0.01 % between 2023 and 2034 and is levied on total foreign tourist expenditure. A key assumption explaining this result is that foreign tourist demand is exogenous in the scenarios and thus tourists do not respond to the imposition of the new tax. With a tax of this magnitude, this may be quite a reasonable assumption with the tax not really factoring in to tourists' decisions to visit the destination.
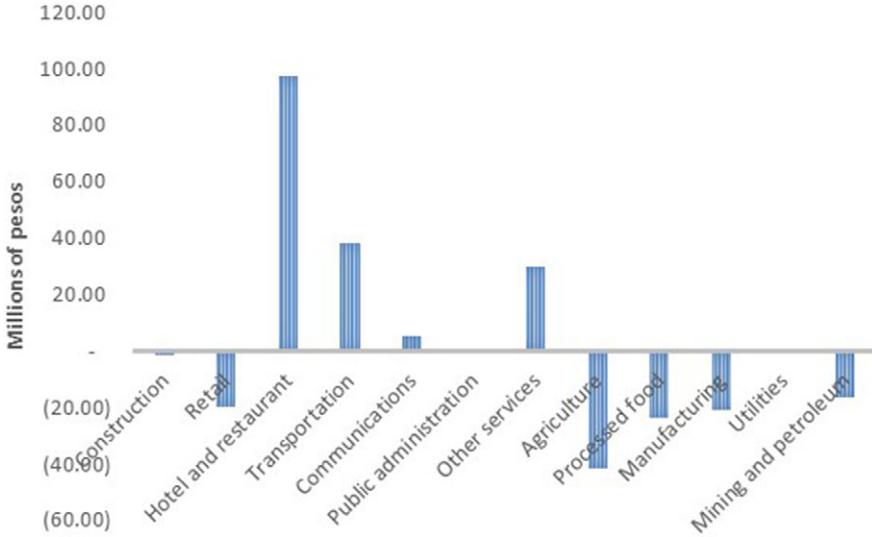
Figure 8 Value added growth, deviation from BASE in 2035, millions of pesos.

4.3 CBA

In this section, the investment is considered from the perspective of a multilateral development bank and from the perspective of the beneficiary government. It is important to note that a multilateral development bank is a non-commercial lender and thus it is not driven by a profit motive but rather one related to improving the welfare of the beneficiary country while meeting its basic operational costs. Equation (2) shows that from the perspective of the lender, the NPV of the investment is calculated by (i) calculating the EV from the demand scenario, which is the estimated national welfare impact of the change in tourism demand [term two in Equation (2)]; (ii) summing this term with the cost of the investment incurred, in this case during the first 5 years; (iii) adding this term with the future repayment of the loan which begins following the grace period of 6 years; and (iv) discounting the calculated values for each year back to the current year.

The EV from the demand scenario is used as the measure of welfare since it would not be conceptually correct to use the EV from combi or combi-pay because they both consider the investment in the calculation of EV. The inevitable disadvantage of this is that the general equilibrium impacts of the investment are not considered in the estimation of EV from the lender's perspective. Should it be possible to consider these general equilibrium impacts, the welfare impacts would generally be greater.

Another feature to note is that in order to calculate an internal rate of return (IRR), it is necessary for there to be at least 1 year of negative cash flow. In Equation (2), this will be the case where in one or more of the first 5 years of loan disbursement, the amount of the loan disbursement is greater than the welfare benefit. We use the standard discount rate of 12 % used by some multilateral lenders such as the Inter-American Development Bank. With the cost of the loan perceived from the lender's perspective in the first 5-years of the NPV analysis, these costs are weighted heavily.

Calculation of NPV from the lender's perspective:

$$NPV = \sum_{t=2017}^{2021} \frac{-L/5}{(1+r)} + \sum_{t=2017}^{2045} \frac{EV_t}{(1+r)^{2017-t}} + \sum_{t=2023}^{2039} \frac{L/17(1+i)}{(1+r)^{2023-t}}, \qquad (2)$$

where L is the total amount of the loan, in this case divided by five, which is the disbursement period. EV is the change in welfare represented by EV from the demand scenario. The first term is the discounted loan issued over the disbursement period. The second term is the discounted welfare impact of the investment over the period of analysis. The third term is the discounted lender's receipts of the loan repayment beginning in 2023 following a 6-year grace period in this case and terminating in 2039.

From the perspective of the beneficiary government, its concern is the welfare benefit generated by the investment and the future repayment of the loan. From this perspective, in almost all circumstances, cash flow will be positive for all years thus precluding the calculation of an IRR. NPV is calculated using the EV from the combi-pay scenario. Discounting this EV estimate yields the NPV of the investment considering general equilibrium impacts of the repayment of the loan. In other words, the second and subsequent round of impacts caused by the diversion of government resources to repay the loan are accounted.

Table 3 shows the results of the NPV analysis from both the multilateral lender and the beneficiary government's perspective. With all direct costs incurred in the first 5 years of the period of analysis, the NPV from the lender's perspective is 94 million pesos. NPV from the beneficiary government's perspective is 282 million pesos. Also shown in Table 3 is the NPV of the investment considering loan repayment financed through a tourist tax rather than household income tax. In this case, NPV is the highest at 318 million pesos. Figure 9 shows the distribution of net benefits of time.

The NPV analysis undertaken from the beneficiary's perspective results in a higher NPV than from the lender's perspective. This is largely a function of the fact that costs from the lender's perspective are incurred in the first 5 years of the analytical time horizon and thus are weighted heavily in the discounting exercise. From the beneficiary's perspective, follow-on costs that may arise from the repayment of the loan are considered. Specifically, modeled in this way, just as CGE analysis accounts for first, second, and subsequent round impacts of increased economic activity, building the

Table 3 Net present value and internal rate of return from the multilateral lender and beneficiary's perspective; millions of pesos.

	NPV	IRR
Lender demand	94	18 %
Beneficiary combi-pay	282	N/A
Beneficiary combi-pay tourist tax	318	N/A
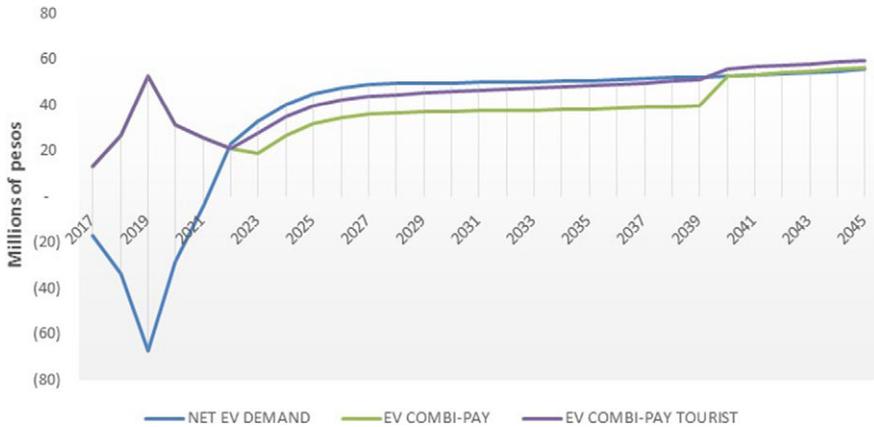
Figure 9 Net benefits calculated with EV from demand, combi-pay, and combi-pay tourist, millions of pesos.

payment in to the CGE analysis also considers the multiple rounds of cost impacts due to forgone government expenditure with government resources allocated toward loan repayment. This is a distinct advantage of the approach presented here.

From the multilateral lender's perspective, the investment results in an internal rate of return of 18 %. From the beneficiary's perspective, it is not possible to calculate an IRR for the investment. The reason for this is that since no costs are incurred until 2023, there is no negative cash flow in the initial years of the investment. That it is not possible to calculate an internal rate of return from the beneficiaries perspective may not be an issue; however, since in practice, once an investment loan has been formulated, the CBA is often used to validate the economic viability of the loan rather than compare among investment opportunities which the main application of the IRR.

5 Discussion and conclusions

In this article, we draw on the strengths of CBA and CGE modeling and present a rigorous and integrated approach to evaluating the ex ante economic impacts of

public investments in tourism. We undertake this analysis from the perspective of a multilateral development bank that provides loanable funds and from the perspective of the beneficiary government. An innovative feature of our approach is that in considering the beneficiary government's perspective, we build-in the repayment of the loan into the CGE analysis and then estimate the NPV of the investment. An important advantage of this approach is that just as the first, second, and subsequent rounds of impacts of increased economic activity are considered in the analysis, it also considers the multiple rounds of impacts created by the diversion of government resources toward loan repayment. As such, our approach takes into consideration any forgone economic activity that may have arisen from reallocation of public budget resources toward the repayment of the loan.

For compatibility with the welfare economics foundations of CBA and the characteristics of public investment in tourism where the target beneficiaries are usually tax paying and voting households, EV is the appropriate measure of welfare and is readily estimated in a CGE framework. There are several strengths of the CGE framework for estimating benefits. First is its ability to capture first and subsequent round investment impacts on household welfare, on both the benefit and cost side. The ability to model household level impacts is a distinct advantage, which provides an attractive alternative to undertaking time consuming and costly household surveys which can be infeasible under the usually tight time and resource constraints characteristic of loan preparation periods faced by multilateral development banks. Second, the CGE approach estimates overall net benefits robustly by explicitly accounting for factor constraints and resource diversion. Third, a CGE model's internally consistent accounting framework renders double counting of benefits and costs impossible.

The analysis of a US$6.25 million public investment in tourism in Uruguay was undertaken from the perspective of a multilateral development bank and the beneficiary government. Viewed from the perspective of the multilateral lender, with the cost to the lender incurred in the first 5 years, the NPV is lower than when compared with the NPV estimated from the perspective of the beneficiary government. This result is explained by the fact that costs incurred by the beneficiary government begin following a 6-year grace period, with repayment beginning in 2023. It is the distribution of these costs and the discounting of net benefits that results in the lower NPV from the perspective of the multilateral development bank.

Internalizing the repayment of the loan in the CGE analysis is more realistic than considering this repayment outside of the modeling framework. With the repayment internalized, public resources allocated to the repayment of the debt has implications for current government expenditure and thus has an opportunity cost associated with it. As shown in this application, despite this consideration of opportunity cost, the

NPV of the investment was still higher when considered from the beneficiary government's perspective because the costs were incurred further in the future when compared with the lender's perspective.

For the purposes of ex ante economic analysis of multilateral development loans, one potential drawback of the approach is that, given the repayment schedule of the investment examined in this study, it was not possible to calculate an IRR from the beneficiary's perspective. This, however, is only a limitation if the CBA is used to compare alternative investments, rather than explore, enhance transparency, and demonstrate the economic viability of a specific investment.

Supplementary Material

To view supplementary material for this article, please visit https://dx.doi.org/10.1017/bca.2019.32.

Appendix

A. 1 Sensitivity analysis of model elasticities

The results from a CGE model are a function of (i) the model structure, including functional forms used to model production and consumption decisions and macroeconomic closures; (ii) the database used for model calibration; and (iii) the values assigned to the model elasticities or, more generally, to the model's free parameters. In other words, the elasticities used in this study implicitly carry an estimation error, as in any similar model. To better understand the implications of this, we performed a systematic sensitivity analysis of the results with respect to the value assigned to the model elasticities. Hence, if the conclusions of the analysis are robust to changes in the set of elasticities used for model calibration, we will have greater confidence in the results presented above.

In the systematic sensitivity analysis, it is assumed that each of the model elasticities is uniformly distributed around the central value used to obtain the results. The range of variation allowed for each elasticity is ±75 %, which represents a fairly wide range of variation for each model elasticity. Our method is a variant of the one originally proposed by Harrison and Vinod (1992). In short, the model is solved iteratively with different sets of elasticities. The resulting distribution of results is used to build confidence intervals for selected model results. The steps for the systematic sensitivity analysis are as follows:

(i) The distribution (i.e., lower and upper bound) is computed for each model parameter that will be modified, which are elasticities of substitution between

Table A1 Systematic sensitivity analysis: 95 % confidence interval for equivalent variation under normality assumption (millions of pesos).

Scenario	Average	Standard deviation	Lower limit	Upper limit
Invest	3.79	0.75	2.32	5.26
Demand	57.77	13.28	31.74	83.79
Combi	61.56	13.45	35.20	87.92
Combi-pay	55.99	13.42	29.69	82.29
Combi-pay tourist	59.24	12.37	34.99	83.50

        primary factor of production, trade-related elasticities, expenditure elasticities, and unemployment elasticities for the wage curves.

(ii) The model is solved repeatedly, each time with a different set of elasticities following a Monte Carlo type procedure. First, the value for all model elasticities is randomly selected. Second, the model is calibrated using the selected elasticities. Third, the same counterfactual scenarios as previously described are conducted. These three steps are repeated 500 times, with sampling with replacement for the value assigned to the elasticities.

Table A1 shows the percentage change in EV in 2045 estimated (i) under the central elasticities and (ii) as the average of the 500 observations generated by the sensitivity analysis. For the second case, the upper and lower bounds under the normality assumption were also computed. All runs from the Monte Carlo experiment receive the same weight. As can be seen, the results for EV reported in the main text are significant and are within the confidence intervals reported in Table A1. For example, it is almost fully certain that the simulated combi scenario would have a positive effect on EV in the range between 35.2 and 87.9 million pesos. In addition, mean-comparison tests show that the increase in EV is significantly higher in the loan repayment with a tourism tax imposed than when loan repayment is financed through income tax.

    Figure A1 shows non-parametric estimates of the density function for the percentage change in EV in 2030 (panel *a*) and 2045 (panel *b*) in three combined scenarios. Again, on average, our qualitative results do not change when model elasticities are allowed to differ by ±75 % of their "central" values.
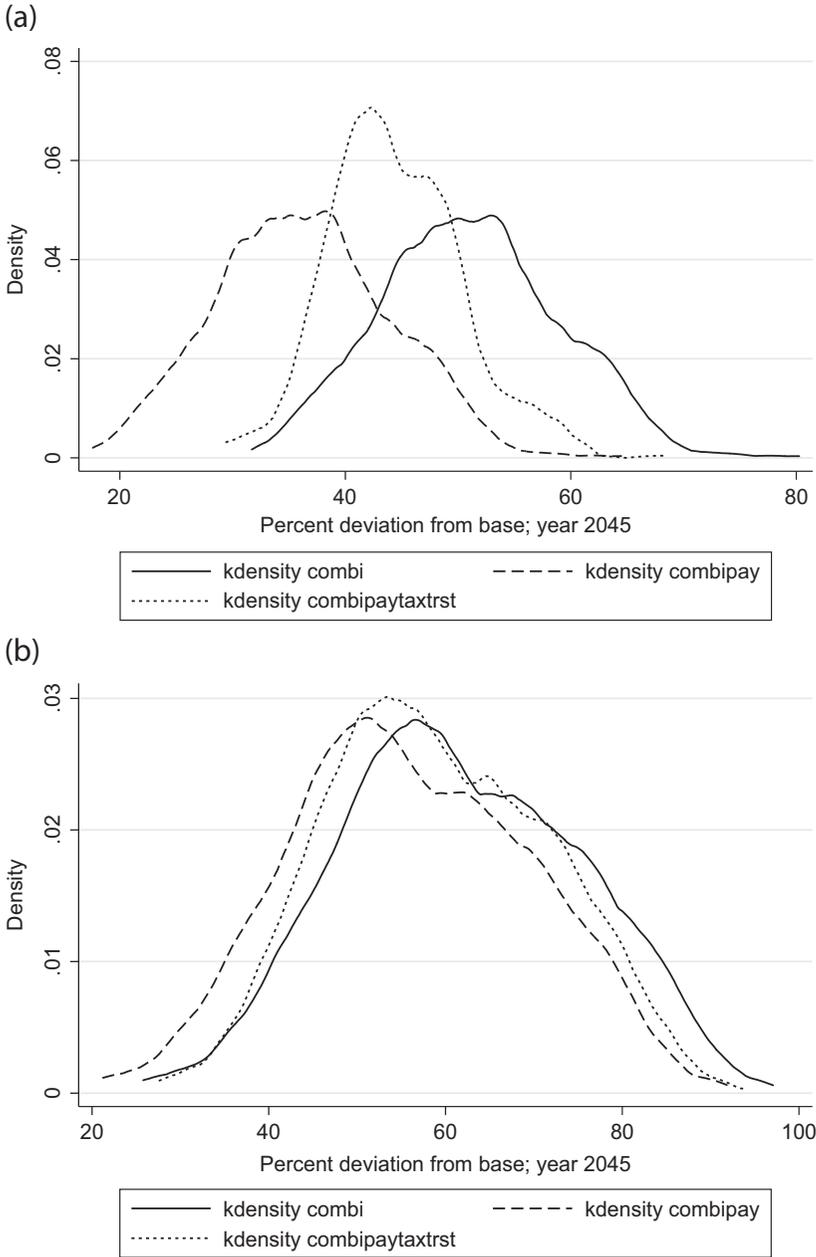
(a)

(b)

Figure A1 (a) Sensitivity analysis, EV in 2030, millions of pesos. (b) Sensitivity analysis, EV in 2045, millions of pesos.

References

Aguiar, A., Narayanan, B., and McDougall, R. 2016. "An Overview of the GTAP 9 Database." *Journal of Global Economic Analysis*, 1: 28.

Abelson, P. 2011. "Evaluating Major Events and Avoiding the Mercantilist Fallacy*. Economic Papers." *A journal of applied economics and policy*, 30, 48–59.

Anaya, Bucheli, and Cecilia González Rodríguez-Villamil. 2012. "An Estimation of the Wage Curve for Uruguay." *Cuadernos de Economía*, 31: 253–270.

Arrow, K. J. 2005. "Personal Reflections on Applied General Equilibrium Models." In *Frontiers in Applied General Equilibrium Modeling: In Honor of Herbert Scarf*, edited by Kehoe, T. J., Srinivasan, T. N., and Whalley, J. Cambridge, UK: Cambridge University Press.

Arrow, K. J., Dasgupta, P., Goulder, L. H., Mumford, K. J., and Oleson, K. 2012. "Sustainability and the Measurement of Wealth." *Environment and Development Economics*, 17: 317–353.

Banerjee, O., and Alavalapati, J. R. R. 2014. "Forest Policy Modelling in an Economy-Wide Framework." In *Handbook of Forest Resource Economics*, edited by Kant, S., and Alavalapati, J. R. R. London, UK: Taylor & Francis.

Banerjee, O., Alavalapati, J. R. R., and Lima, E. 2016a. "A Framework for Ex-ante Analysis of Public Investment in Forest-Based Development: An Application to the Brazilian Amazon." *Forest Policy and Economics*, 73: 204–214.

Banerjee, O., and Cicowiez, M. 2019. Frontiers in the Economic Analysis of Public Investment in Tourism (In Preparation).

Banerjee, O., Cicowiez, M., and Cotta, J. 2016b. "Economics of Tourism Investment in Data Scarce Countries." *Annals of Tourism Research*, 60: 115–138.

Banerjee, O., Cicowiez, M., and Dudek, S.. 2019a. *Integrating Feedbacks Between Ecosystem Service Supply and Economic Systems: An Application of the IEEM+ESM Platform to the SDGs in Guatemala*. Washington, DC: Inter-American Development Bank (in preparation).

Banerjee, O., Cicowiez, M., and Gachot, S. 2015. "A Quantitative Framework for Assessing Public Investment in Tourism – An Application to Haiti." *Tourism Management*, 51: 157–173.

Banerjee, O., Cicowiez, M., Horridge, J. M., and Vargas, R. 2019b. "Evaluating Synergies and Trade-offs in Achieving the SDGs of Zero Hunger and Clean Water and Sanitation: An Application of the IEEM Platform to Guatemala." *Ecological Economics*, 161: 280–291.

Banerjee, O., Cicowiez, M., Horridge, M., and Vargas, R. 2016c. "A Conceptual Framework for Integrated Economic–Environmental Modeling." *The Journal of Environment & Development*, 25: 276–305.

Banerjee, O., Cicowiez, M., Morris, E. J., and Moreda, A. 2018. "Boosting Tourism's Contribution to Growth and Development: Analysis of the Evidence." *Review of Development Economics*, 22: 1296–1320.

Banerjee, O., Cicowiez, M., Vargas, R., and Horridge, J. M. 2019c. "The SEEA-Based Integrated Economic-Environmental Modelling Framework: An Illustration with Guatemala's Forest and Fuelwood Sectors." *Environmental and Resource Economics*, 721: 539–558.

Bartik, T. J. 2012. "Including Jobs in Benefit-Cost Analysis." *Annual Review of Resource Economics*, 4: 55–73.

Blake, A. 2005. "*The Economic Impact of the London 2012 Olympics*." Report for the Department of Culture, Media, and Sport and the London Development Agency, London. London, UK: Department of Culture, Media, and Sport and the London Development Agency.

Blanchflower, D. G., and Oswald, A. J. 1994. "Estimating a Wage Curve for Brittan: 1973–90." *Economic Journal*, 104: 1025–1043.

Blanchflower, D. G., and Oswald, A. J. 2004. "Well-Being Over Time in Britain and the USA." *Journal of Public Economics*, 88: 1359–1386.

Burfisher, M. E. 2017. *Introduction to Computable General Equilibrium Models*, 2nd ed. Cambridge, UK: Cambridge University Press.

Burgan, B., and Mules, T. 2001. "Reconciling Cost-Benefit and Economic Impact Assessment for Event Tourism." *Tourism Economics*, 7: 321–330.

Cattaneo, A. 2002. *Balancing Agricultural Development and Deforestation in the Brazilian Amazon. Research Report.* Washington, DC: International Food Policy Research Institute.

Champ, P. A., Boyle, K. J., and Brown, T. C. 2003. *A Primer on Nonmarket Valuation.* Dordrecht, The Netherlands; Boston, MA: Kluwer Academic Publishers.

Cicowiez, M. 2016. Nota Técnica: Construcción de una Matriz de Contabilidad Social para Uruguay para el Año 2013. *IDB Project Document.* Washington, DC: Inter-American Development Bank.

Dixon, P., and Jorgenson, D. W., eds. 2012. *Handbook of Computable General Equilibrium Modeling*. Oxford, UK: Elsevier.

Dixon, P. B., Parmenter, B. R., Powell, A., and Wilcoxen, P. J. 1992. *Notes and Problems in Applied General Equilibrium Economics*. Amsterdam, Netherlands: North-Holland.

Dixon, P. B., and Rimmer, M. T. 2002. *Dynamic General Equilibrium Modelling for Forecasting and Policy: A. Practical Guide and Documentation of MONASH*. Amsterdam, Netherlands: North-Holland.

Dixon, P. B., Rimmer, M. T., and Waschik, R. 2017. "Linking CGE and Specialist Models: Deriving the Implications of Highway Policy Using USAGE-Hwy." *Economic Modelling*, 66: 1–18.

Dwyer, L., Forsyth, P., and Spurr, R. 2005. "Assessing the Economic Impacts of Events: A Computable General Equilibrium Approach." *Journal of Travel Research*, 45: 59–66.

Dwyer, L., Forsyth, P., and Spurr, R. 2003. "Inter-Industry Effects of Tourism Growth: Implications for Destination Managers." *Tourism Economics*, 9: 117–132.

Dwyer, L., Jago, L., and Forsyth, P. 2016. "Economic Evaluation of Special Events: Reconciling Economic Impact and Cost-Benefit Analysis." *Scandinavian Journal of Hospitality and Tourism*, 16: 115–129.

Eugenio-Martin, J. L., and Inchausti-Sintes, F. 2016. Programa de Desarrollo de Corredores Turisticos UR-L1113. *Anexo, Analisis Economico Ex-Ante.* Washington, DC: Inter-American Development Bank.

European Commission, Food and Agriculture Organization, International Monetary Fund, Organisation for Economic Cooperation and Development, United Nations, and World Bank. 2009. System of National Accounts 2008. EC, IMF, OECD, UN, WB.

European Commission, Food and Agriculture Organization, International Monetary Fund, Organisation for Economic Cooperation and Development, United Nations, and World Bank. 2012. System of Environmental-Economic Accounting. Central Framework. EC, FAO, IMF, OECD, UN, WB.

Hanley, N., and Spash, C. L. 1993. *Cost-Benefit Analysis and the Environment.* Cheltenham, UK: Edward Elgar.

Harrison, G., and Vinod, H. 1992. "The Sensitivity Analysis of Applied General Equilibrium Models: Completely Randomized Factorial Sampling Designs." *The Review of Economics and Statistics*, 74: 357–362.

Johnston, R. J., Boyle, K. J., Adamowicz, W., Bennett, J., Brouwer, R., Cameron, T. A., Hanemann, W. M., *et al.* 2017. "Contemporary Guidance for Stated Preference Studies." *Journal of the Association of Environmental and Resource Economists*, 4: 319–405.

Jones, R. W. 1965. "The Structure of Simple General Equilibrium Models." *The Journal of Political Economy*, 73: 557–572.

King, B. B. 1985. "What is SAM?" In *Social Accounting Matrices: A Basis for Planning*, edited by Pyatt G., and Round J. Washington, DC: World Bank.

Lange, G.-M., Wodon, Q., and Carey, K., eds. 2018. *The Changing Wealth of Nations 2018: Building a Sustainable Future*. Washington, DC: World Bank.

Layman, B. 2004. "CGE Modelling as a Tool for Evaluating Proposals for Project Assistance: A View from the Trenches." In *Forth Biennial Regional Modelling Workshop in Melbourne: Policy Applications of Regional CGE Modelling*. Melbourne, Australia: University of Western Australia.

Lofgren, H., Harris, R. L., Robinson, S., Thomas, M., and El-Said, M. 2002. *A Standard Computable General Equilibrium (CGE) Model in GAMS*. Washington, DC: IFPRI.

Ministerio de Turismo. 2018. *Anuario 2018: Estadisticas de Turismo*. Montevideo, Uruguay: Ministerio de Turismo.

Ministerio de Turismo. 2019. Turismo Receptivo. Datos Trimestrales. Montevideo: Ministerio de Turismo.

Mishan, E. J. 1988. *Cost-Benefit Analysis*. London, UK: Unwin Hyman.

Moreda, A., Hintze, L. H., Banerjee, O., Valle, Y., Levy, D., Rauschert, N., Salazar, D., Bachino, F., and Maya, V. 2017. "Línea de Crédito Condicional Para el Desarrollo Nacional del Turismo (UR-O1149)." In *Primera Operación Individual: Programa de Desarrollo de Corredores Turísticos (UR-L1113). Propuesta para el Desarrollo de la Operación*. Washington, DC: Inter-American Development Bank.

Pearce, D. W., Atkinson, G., and Mourato, S. 2006. *Cost-Benefit Analysis and the Environment: Recent Developments*. Paris, France: OECD.

Polasky, S., Bryant, B., Hawthorne, P., Johnson, J., Keeler, B., and Pennington, D. 2015. "Inclusive Wealth as a Metric of Sustainable Development." *Annual Review of Environment & Resources*, 40: 445–466.

Pyatt, G., and Round, J., eds. 1985. *Social Accounting Matrrices: A Basis for Planning*. Washington, DC: The World Bank.

Robinson, S. 1989, "Multisectoral Models." In *Handbook of Development Economics*, edited by Hollis Chenery and T. N. Srinivasan. Amsterdam, Netherlands: Elsevier.

Stiglitz, J. E., Sen, A. K., and Fitoussi, J. P. 2010. *Mis-Measuring Our Lives: Why GDP Doesn't Add Up*. New York, NY: New Press.

Taylor, J. E. 2010. Technical Guidelines for Evaluating the Impacts of Tourism Using Simulation Models. *Impact Evaluation Guidelines*. Washington, DC.

Taylor, J. E., and Filipski, M. J. 2014. *Beyond Experiments in Development Economics: Local Economy-Wide Impact Evaluation*. Oxford, UK: Oxford University Press.

UNWTO. 2014. "Computable General Equilibrium Modelling for Tourism Policy-Inputs and Outputs." In *Statistics and TSA Issues Paper Series*. Madrid, Spain: United Nations World Tourism Organization.

WTTC. 2019. *Travel & Tourism: Economic Impact 2018 Uruguay. Economic Impact*. London, UK: World Travel and Tourism Council.

Deven Carlson, Simon Haeder, Hank Jenkins-Smith* ,
Joseph Ripberger, Carol Silva and David Weimer

Monetizing Bowser: A Contingent Valuation of the Statistical Value of Dog Life

Abstract: Households in the USA spend about $70 billion annually on pets. Dogs, the most common pet, can be found in nearly half of American households. An important shadow price in the analysis of policies affecting human mortality is the value of statistical life (VSL), which is imputed from how people make decisions involving tradeoffs between small mortality risks and other goods. The value of statistical dog life (VSDL) is also an important, but until now unavailable, shadow price for use in regulation of such goods as pet foods and environmental toxins. Additionally, an estimate of the VSDL would have uses outside the regulatory process in valuing programs involving zooeyia, in setting tort awards for wrongful dog death, and in property divisions in divorce settlements where joint custody of dogs is not feasible. In order to estimate the VSDL, we conducted a contingent valuation of a national sample of dog owners that elicited willingness-to-pay for changes in mortality risk for pet dogs. Specifically, respondents were asked about willingness-to-pay for a vaccine that would reduce the risk of canine influenza. The design included both quantity (different magnitudes of risk reduction from the offered vaccine) and quality (differences in nature of death from the influenza) treatments as scope tests. It also included treatments involving spillover effects to other dogs and a priming question about disposable income. Based on the analysis and consideration of its assumptions, we recommend $10,000 as the VSDL.

Keywords: health; law and regulation; other social policy.

JEL classifications: C83; D61; I19

Deven Carlson: Political Science, University of Oklahoma, Norman, OK, USA
Simon Haeder: Political Science, Pennsylvania State University, University Park, PA, USA
*Corresponding author: Hank Jenkins-Smith, Political Science, University of Oklahoma, Norman, OK, USA, e-mail: hjsmith@ou.edu
Joseph Ripberger: Political Science, University of Oklahoma, Norman, OK, USA
Carol Silva: Political Science, University of Oklahoma, Norman, OK, USA
David Weimer: La Follette School of Public Affairs, University of Wisconsin, Madison, WI, USA

1 Introduction

A majority of U.S. households owns pets: 48 % own dogs and 37 % own cats (APPA, 2018). People spend substantial amounts of money on pets, which they often view as beloved companions or even family members (Schwarz et al., 2007; Kirk, 2019). In 2017, households in the USA spent over $69 billion dollars on pets, including over $17 billion on veterinary care (APPA, 2018). These expenditures suggest that Americans place substantial value on their pets. But, what monetary value do they implicitly place on the lives of their pets when making decisions that affect the mortality risks that their pets face? We seek to answer this question for pet dogs.

The value of statistical life (VSL), an estimate of the average dollar value people in some population appear to place on their own lives when making decisions that involve mortality risk, plays an important role in U.S. health and safety regulation as the shadow price for avoided fatalities. Numerous estimates of the VSL have been made based on revealed preferences, especially wage premiums demanded for riskier jobs, and on stated preferences, such as expressed willingness-to-pay for safety devices (Viscusi & Aldy, 2003, Robinson, 2007). Current estimates of the VSL for the U.S. general population are on the order of $10 million (Viscusi, 2018). That is, on average, Americans appear to be making decisions involving small changes in mortality risks as if they were valuing their own lives at $10 million, which in turn serves as a willingness-to-pay based shadow price for avoided fatalities in cost-benefit analyses of proposed regulations. However, some regulations also affect the mortality risk of pets. Assessing the efficiency of regulations affecting pets requires an estimate of the dollar value pet keepers place on their pets' lives. With respect to pet dogs, such analyses require an estimate of the value of statistical dog life (VSDL).

Pets face mortality risk from a variety of sources. For example, contaminated or adulterated pet food poses a substantial mortality risk to dogs and cats. In 2007, thousands of dogs and cats died in the USA because their food was contaminated with melamine, a cheap adulterant that makes flour appear to be gluten, a more valuable protein-rich wheat (Nestle, 2008). Concerns about the adulteration of food additives in both pet and human food contributed to a strengthening of regulatory authority for the Food and Drug Administration (FDA) through the FDA Food Safety Modernization Act (P.L. 111-353) in 2010. In its subsequent rulemaking, the FDA set higher standards for animal food manufacturing (FDA, 2015). Although the primary benefit in the Regulatory Impact Analysis supporting the rule was the reduction in human salmonellosis from handling pet food, the analysts monetized reductions in illness risks to pet dogs and cats at $2434 based on responses to a survey submitted to the regulatory docket that asked people about their willingness-to-pay for veterinary

visits. The analysts recognized the monetization as questionable because the survey did not employ an explicit stated preference format, but rather asked about making a payment for veterinary care for an already sick dog and thus not an appropriate basis for valuing changes in mortality risk. A VSDL derived using appropriate stated preference methods would allow the FDA to conduct more confident cost-benefit analyses of future rules affecting pet mortality. One can also imagine the assessment of rules by the Environmental Protection Agency affecting pet mortality, such as those regulating pesticide use, or by the Federal Aviation Administration (FAA) with regard to air transport as also benefiting from a reliable estimate of the VSDL.

A reliable estimate of the VSDL could potentially have utility beyond the regulation of the health and safety of pets, although we acknowledge that some caution is required in its use beyond the regulation of mortality risks. Like the VSL, it does not necessarily capture what, on average, people are willing to pay to avoid certain deaths of identifiable individuals. Just as one may have limits on the amount of money one may be willing to spend on house modifications to reduce grandma's risk of a deadly fall but willing to spend all available resources to keep her alive once she has fallen, one may be willing to spend less on reducing the mortality risk of one's pet than providing veterinary care once the pet is ill. That said, the human capital approach favored by courts in making awards in wrongful death cases has no direct analog for pets, at least those not used as breeders, which means the VSDL may be the only approach available for many applications.

With these considerations in mind, the first potential use of VSDL is as a starting point for valuations of companionship with dogs. Such valuations are directly relevant to cost-benefit analyses of programs to aid the disabled and promote human health through zooeyia (Hodgson et al., 2015). Combining the VSDL with information about the expected longevity of the dog allows estimation of the value of a dog life-year (VDLY). The VDLY would be a useful shadow price for integrating companionship into estimates of the net benefits of zooeyia programs involving dogs.

Second, the VSDL would provide a basis for valuing loss of companionship with pet dogs in tort cases. Courts generally restrict recovery of damages for the wrongful death of dogs to their market value. Some have argued that an approach more consistent with the common law would award damages based on emotional distress and loss of companionship (Martin, 2011). However, establishing the appropriate magnitude of such awards on an individual basis has been generally deemed by the courts as impractical. A population-based estimate of mean VSDL could serve as a default value to promote appropriate deterrence, if not achieve perfect compensation.

Third, the VSDL would provide a sounder basis for public investment in veterinary science and medicine. Research that reduces dog mortality clearly has a value to dog keepers. The availability of the VSDL would allow a better assessment of

alternative research programs or treatments that offer different combinations of changes in morbidity and mortality.

Fourth, divorce settlements involving only marketable property can be easily resolved by allocating each party the appropriate fraction of total assets. In cases involving custody of children, the allocations are more complicated because one party cannot be financially compensated for loss of custody. As dogs can be legally and morally bought and sold, in cases where joint custody of pet dogs is not practical, say for geographic reasons, the VSDL could provide a basis for determining the financial payment that the party gaining custody should pay as compensation to the party losing custody. As with torts involving wrongful death, courts have difficulty placing a value on companionship. A population-based mean VSDL would thus provide a starting point for negotiations over custody.

To develop an estimate of the VSDL, we conducted a survey of a sample of U.S. households with pet dogs that allows us to apply the contingent valuation method (CVM). Specifically, we elicited willingness-to-pay for a vaccine that would reduce the mortality risk to pet dogs from a newly emergent virus.

2 Experimental design

Our experiments are motivated by the H3N2 canine influenza, which first appeared in the USA in 2015 and can now be found in 30 states (Centers for Disease Control and Prevention, 2019). Canine influenza H3N2 is highly contagious and so far appears to have a mortality rate of less than 10 % (American Veterinary Medical Association, 2019). Vaccines against it and the H3N8 strain are currently available.

Table 1 summarizes the five CVM experiments we conducted. Each experiment involved a hypothetical threat such that over the next year the respondent's pet would face a 12 % morality risk from canine influenza. Each respondent only received one of the five elicitations. The base case (Experiment 1) employed the following script where *name* is the name of the pet provided by the respondent and *X* is the randomly assigned bid amount drawn from a uniform distribution ranging from $5 to $3000.

Table 1 Contingent valuation method experiments: 12 % risk without vaccination.

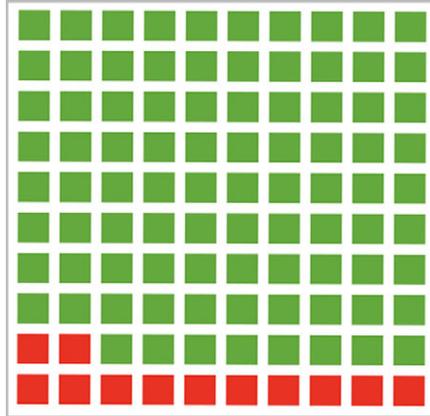| Experiment	Risk with vaccination (%)	Suffering	External risk	Discretionary income priming
1	2	No	No	No
2	2	No	No	Yes
3	6	No	No	No
4	2	Yes	No	No
5	2	No	Yes	No

Figure 1 Survey representation of risk of dog death due to virus.

Imagine that scientists have identified a new strain of canine influenza that will threaten dogs in your area during the coming year. Most dogs that contract the influenza over the next year will only show mild symptoms, but some dogs will die suddenly from the virus. Veterinarians estimate that a dog in your area will have a 12 % chance of contracting the new influenza strain and dying from it over the next year. Fortunately, it is not expected that this strain of influenza will remain a threat beyond the next year.

The squares in the diagram [Figure 1] represent the risk a dog in your area has of dying from the influenza virus over the next year. Each square represents one dog. Green squares represent dogs that do not die from the influenza; red squares represent dogs that do die from the influenza. Assume that the mortality risk for your dog is represented by the chance of randomly drawing a red square.

Now imagine that a vaccine is available to provide some protection against the influenza. The vaccine would reduce the risk that (*name*) would contract the new influenza strain. Specifically, the vaccine would reduce the chance of (*name*) dying from the influenza during the next year from 12 to 2 %.

The diagram on the left [Figure 2] represents the risk a dog in your area has of dying from the influenza virus over the next year if the dog receives the vaccine. For comparison, the diagram on the right represents the risk of dying from the influenza virus over the next year if the dog does not receive the vaccine.

Imagine that your out-of-pocket costs to have (*name*) vaccinated against the new strain of influenza would be $(*X*). This is the amount you would have to
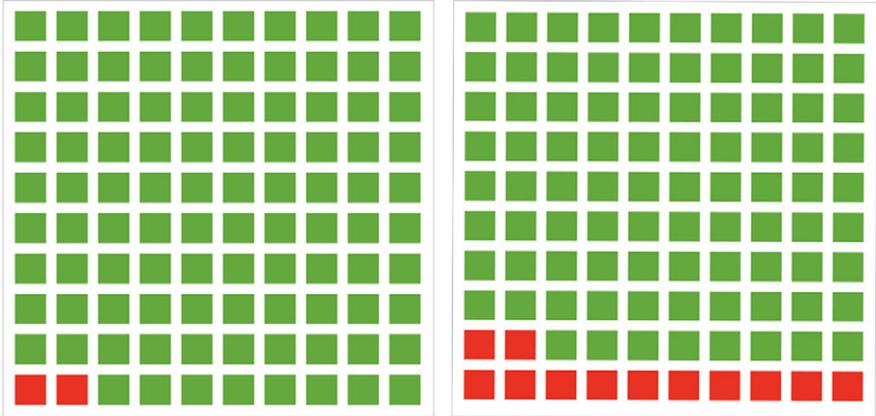
Figure 2 Survey representation of comparison of risk of dog death due to virus with and without the vaccine.

pay whether or not you have either pet insurance or a prepaid plan with a veterinarian. Remember that this amount of money would not be available to you to use for other expenses such as grocery bills, utilities, recreation, or savings. Would you pay $(X) to purchase the vaccine for *name*?

In addition to the base case (Experiment 1), we also conducted four other experiments that allow us to conduct several sensitivity analyses and robustness checks. Experiment 2 primed the respondent with a question about disposable income prior to the elicitation. Experiment 3 served as the quantitative scope test by offering a less effective vaccine. Experiment 4 served as a qualitative scope test, replacing the statement of sudden death with "Dogs that contract the influenza in the next year are expected to suffer severe and painful respiratory symptoms including coughing and choking prior to death." Lastly, Experiment 5 introduced external effects through the following addition: "The vaccine would also greatly reduce the risk that *name* would spread the influenza to other dogs. On average, for each dog that gets the vaccination, one additional dog will be saved from dying from the influenza." In all the experiments, respondents who stated a willingness-to-purchase the vaccine were asked how certain they were about making a purchase. Follow-up questions also asked about how likely they thought a new strain of canine influenza would put their dog at risk, and how plausible they thought it was that a vaccine could protect their dog from the influenza.

In the analyses to follow, our primary results are based on combined data from Experiments 1 and 2. Our choice to combine the data from these two experiments was driven by the fact that analysis indicated no effect of disposable income priming – the larger sample size also provides us with greater statistical power. Along with our primary results, we also present results from both the quantitative and qualitative

scope tests – Experiments 3 and 4, respectively – as well as from the scenario that introduced the notion of external effects (Experiment 5).

3 Survey data

The University of Oklahoma's Center for Risk and Crisis Management administered a survey to a national sample of dog keepers drawn from a Qualtrics panel of willing respondents. The survey was fielded from May 18 to 23, 2018, and completed by 4975 adults who kept dogs in their households. This analysis focuses on the 4682 respondents who considered their dogs to be primarily pets, excluding those for whom dogs were primarily guides, breeders, guards, or used in agriculture. As almost half of U.S. households keep dogs, it is reasonable to assume that the Qualtrics panel produces a representative national sample of dog owners. As a further assessment of representativeness, we compared the most common male and female dog names in our sample to those reported by Rover.com, the largest network of dog sitters and walkers, and the most common male and female names of dogs in our sample in households with pet insurance or prepaid veterinary plans to those reported by Embrace Pet Insurance (Appendix). The overlap between the dog names in the sample and on Rover.com is remarkable, increasing our confidence in the representativeness of the sample.

In addition to the questions directly related to the elicitation of the willingness to pay, the survey also contained standard demographic questions, including income and family situation. A question was also asked about whether or not the respondent viewed the dog as a companion – see Kirk (2019) for an analysis of the importance of value attachment through a sense of "psychological ownership" for companion dogs. There were also a number of questions about the dog. The most important of these questions was the number of additional years that respondents expected their dogs to live, which is required to convert VSDLs into VDLYs. Because of concern that respondents would have difficulty answering this question, we asked about the weight and current age of their dogs. Based on dogs' weights and current ages, we looked up an estimate of expected number of years of additional life in a life table for dogs (Inoue et al., 2015). If the number of expected years in the life table (*expected_life*) were greater than zero, we asked the following question:

On average, a dog with (*name's*) weight and age would be expected to live (*expected_life*) more years. Note that this is only an average, so that (*name*) could live more or fewer years. Barring an accident, and given your knowledge of (*name's*) health, what is your best guess about how many more years (*name*) will live?

If the number of expected years in the life table were zero, then we asked the following:

Based on published studies of the life spans of dogs by age and weight, (*name*) has lived longer than average. Barring an accident, and given your

knowledge of (*name's*) health, what is your best guess about how many more years (*name*) will live?

The answers to these questions provided an estimate of how long respondents expected their dogs to live. Overall, the correlation between the life table and the respondents' estimates was 0.63 with 54 % expecting their dogs to outlive the life table.

4 Estimation methods

A major concern in the use of CVM is that the hypothetical nature of the choice leads some respondents to accept bids when, if faced with actual choices, they would reject them. To guard against this sort of bias, researchers usually include a follow-up question asking about how certain respondents are of their acceptance of the bid (Champ et al., 1997). "Don't know" responses and acceptances without a high level of certainty are converted to rejections. Especially with respect to private goods, where comparisons can be made between the stated preferences in the CVM and observed market behavior, this procedure appears to eliminate bias resulting from the hypothetical nature of the choice (Blumenschein et al., 2007). Following this approach, we estimate the mean WTP after recoding acceptances as rejections if respondents expressed a certainty of less than 8, on a scale from 0 to 10 in which 0 corresponds to "Not at all confident" and 10 corresponds to "Extremely confident."

We assume an underlying random utility model in which WTP is an exponential function of the bid price (Hanemann & Kanninen, 1999; Haab & McConnell, 2002). A standard logistic regression with the natural log of the bid price can be used to estimate the mean and standard deviation of WTP using formulas derived by Buckland et al. (1999). Specifically, we estimate the following model:

$$E[y_i] = \frac{1}{1 + e^{-\beta[\ln(p_i) - \mu_i]}}, \tag{1}$$

where y_i is an indicator of bid acceptance, β is the coefficient of the natural log of the bid, p_i, and μ_i is the WTP for the ith respondent, which is a function of the covariates other than p_i. This equation implies the following probability density function over p:

$$f(p_i) = \frac{-\beta e^{-\beta[\ln(p_i) - \mu_i]}}{p_i \{1 + e^{-\beta[\ln(p_i) - \mu_i]}\}^2}, \tag{2}$$

which can be implemented with the empirical estimate b of β and m_i of μ_i. We use numerical integration (from 0 to \$15,000, an amount five times the upper bid price of \$3000) to estimate the mean WTP for the ith respondent using

$$\bar{\mu}_i = \int_0^\infty p f(p) \mathrm{d}p. \tag{3}$$

To derive an estimate of the variance of mean WTP, let m_i be the predicted value of μ_i, b the estimated value of β, and $u_i = e^{-b[\ln(p)-m_i]}$. The variance of m_i is given by

$$
\begin{aligned}
var(m_i) \cong\ & var(b)\left(\int_0^\infty \frac{u_i[bln(p)-1-\{bln(p)+1\}u_i]}{(1+u_i)^3}\mathrm{d}p\right)^2 \\
& + var(m_i)\left(\int_0^\infty \frac{b^2 u_i(u_i-1)}{(1+u_i)^3}\mathrm{d}p\right)^2 \\
& + 2cov(b,m_i)\left(\int_0^\infty \frac{u_i[bln(p)-1-\{bln(p)+1\}u_i]}{(1+u_i)^3}\mathrm{d}p\right)\left(\int_0^\infty \frac{b^2 u_i(u_i-1)}{(1+u_i)^3}\mathrm{d}p\right),
\end{aligned}
$$
$$(4)$$

where the integrals are evaluated numerically. The mean and variance of WTP average over the values for the i respondents in the sample.

The analysis assumes that μ_i is a function of two types of variables, those directly affecting utility and those affecting perception of the hypothetical elicitation. As an economic choice and assuming respondents view vaccination as a private good, we expect income to contribute to a greater willingness-to-pay for the vaccine. To take account of different household sizes, we divided reported income by the Federal Poverty Line (FPL) that takes account of the number of people in the household (U.S. Department of Health and Human Services, 2019). We expect a greater WTP for dogs with expected longer future lives. We also expect a greater WTP for dogs that keepers explicitly view as companions; furthermore, we hypothesize that, because the length of the relationship likely contributes to a stronger sense of companionship, willingness-to-pay should be larger for older dogs. Although the elicitation clearly specifies that the bid price is an additional out-of-pocket cost, and the standard budget reminder reinforces this by noting that accepting it would reduce money available for other expenditures, we hypothesize that those who have either pet insurance or a prepaid veterinary plan may be more risk-averse. Consequently, we include a variable in the estimation that indicates whether or not the respondent has either an insurance policy or a prepaid plan for the dog. Keeping more than one dog may have competing effects. On the one hand, we might hypothesize that respondents with more than one dog might have a lower WTP if they anticipate purchasing the vaccination for all their dogs. On the other hand, we could hypothesize that the additional dog or dogs would make the marginal loss of companionship from the death of the dog smaller than it would be if the respondent only keeps one dog. We also hypothesize respondents living alone will have a higher WTP as companionship with their dogs may substitute for family companionship.

In addition, we hypothesize that three variables will potentially influence how respondents perceive the hypothetical elicitation. First, respondents who see the threat of canine influenza as more likely should be more likely to view their response

to the elicitation as consequential. Therefore, we created an indicator to identify respondents who reported that they thought it was either somewhat or extremely likely that their dogs would be exposed to a new strain of canine influenza. Second, respondents who see a protective vaccine as plausible would also be more likely to see the elicitation as consequential. We identified these respondents with an indicator. In the analysis that follows, we expect that respondents who both see the influenza risk likely and a vaccine as plausible will be more likely to take the elicitation seriously. In that sense, we expect the respondents identified by these indicators to be more receptive to the elicitation, and therefore to provide particularly revealing responses. Third, respondents who support local governments mandating vaccination of dogs against communicable diseases like canine influenza are more likely to see their own voluntary acceptance of vaccination as more desirable, so we expect them to have a larger WTP.

To obtain estimates of the VSDL, we divided the estimated mean WTP in each experiment by the stated change in mortality risk. That is, for all the experiments except the quantitative scope test, we obtain the VSDL by dividing the mean WTP by 0.10, the reduction in mortality risk offered by the vaccine (0.12 reduced to 0.02). For the quantitative scope test, we obtain the VSDL by dividing the mean WTP by 0.06, the reduction in mortality risk offered by the vaccine (0.12 reduced to 0.06).

To obtain the mean VDLY, we calculated an annuity factor, $a_d^n = [1 - (1+d)^{-n}]/d$, for a discount rate of $d = 0.035$ (Boardman et al., 2018) and n equal to the respondent's expected number of additional years of life for his or her dog. We then divided each respondent's predicted WTP from the estimated model by his or her annuity factor to obtain the VDLY from an individual's perspective. We then average over the relevant sample to obtain a mean VDLY.

5 Estimation

Table 2 displays the logistic regression estimates and the associated estimates of the mean WTPs and their standard deviations. The first column presents results for pooled data from the first and second experiments, which differ only in terms of discretionary income priming. The second and third columns present results for the quantitative and qualitative scope tests, respectively. The last column presents results for the experiment with an external benefit, the saving of an additional dog from vaccination of one's own dog. Looking across the experiments, all show a strong price effect – the coefficients of the natural log of the bid prices are negative and statistically significant, consistent with respondents treating the elicitations as economic decisions. The ratio of income to the FPL does not appear to affect the probability of bid acceptance, which, if we treat the vaccination as a purely private

Table 2 Estimation of willingness-to-pay: logistic coefficients and standard errors.

	Base case and income priming (Exp. 1 and 2)	Quantity scope test (Exp. 3)	Quality scope test (Exp. 4)	External benefit (Exp. 5)
Ln of bid	−0.50[*] (0.060)	−0.47[*] (0.089)	−0.47[*] (0.084)	−0.65[*] (0.086)
Ratio of income to FPL	0.038 (0.025)	0.018 (0.036)	−0.011 (0.036)	0.0064 (0.035)
Dog viewed as companion	0.28[*] (0.13)	0.25 (0.19)	0.30 (0.18)	0.67[*] (0.19)
Expected years of life	0.074[*] (0.020)	0.073[*] (0.025)	0.062[*] (0.027)	0.057[*] (0.026)
Age of dog (years)	0.076[*] (0.021)	0.079[*] (0.027)	0.052 (0.030)	−0.0076 (0.026)
Insurance or prepaid plan	0.46[*] (0.15)	0.46[*] (0.21)	0.85[*] (0.20)	0.39 (0.21)
Lives alone	0.12 (0.18)	0.42 (0.24)	0.34 (0.22)	0.61[*] (0.23)
More than one dog	−0.11 (.13)	0.080 (0.20)	0.0076 (0.18)	0.33 (0.18)
Influenza risk likely	0.58[*] (0.16)	0.68[*] (0.23)	0.58[*] (0.21)	0.62[*] (0.24)
Vaccination plausible	0.91[*] (0.14)	0.93[*] (0.20)	0.68[*] (0.19)	0.74[*] (0.20)
Vaccination should be mandatory	1.70[*] (0.14)	1.33[*] (0.20)	1.01[*] (0.18)	1.29[*] (0.19)
Discretionary income priming	−0.035 (0.13)	—	—	—
Constant	−0.803 (0.50)	−1.01 (0.73)	−0.22 (0.72)	0.80[*] (0.67)
χ^2	422.5[*]	184.1[*]	163.2[*]	215.9[*]
Coefficient of discrimination	0.24	0.21	0.18	0.24
Sample size	1836	918	905	923
Mean WTP ($)	676	603	715	784
SE WTP ($)	90	162	196	126
Mean VSDL ($)	6760	10,050	7150	7840
Mean VDLY ($)	1230	1880	1300	1440

Abbreviation: FPL, Federal Poverty Line.
[*] Statistically significant at the 5 % level.

good, raises some concern about the elicitation being seen by respondents as an economic choice. We note that a similar pattern appears when income rather than the ratio of income to the FPL is included in the model. A "surprisingly large" number of CVM studies report small income effects (Schläpfer, 2006, p. 423). To the extent that respondents perceive the welfare of their dogs altruistically so that they do not view them as pure public goods, following Flores and Carson (1997), we do not necessarily expect a positive income elasticity of demand to translate into a positive income elasticity for WTP.

As with income, the variable in the first column indicating discretionary income priming does not have a statistically significant coefficient. To further allay these concerns about the absence of a measurable income effect, the pattern of the mean WTPs across the experiments is consistent with expectations. Most importantly for assessing the validity of the elicitation, the quantitative and qualitative scope tests

show the expected pattern of relative magnitudes. The quantity scope test entails, relative to the base case, the vaccine generating a smaller reduction in the probability of mortality – the vaccine reduces the probability of mortality by 10 percentage points in the base case but only 6 percentage points in the quantity scope test. This smaller reduction in the probability of mortality should be accompanied by a lower WTP and that is indeed what the results in Table 2 demonstrate. Estimated WTP for the base case is $676 but only $603 in the quantity scope test. The qualitative scope test informs the respondent that dogs contracting canine influenza often experience significant pain and suffering prior to death, including coughing and choking. The base case, in contrast, informed respondents that death from canine influenza was sudden and painless. In theory, respondents should be willing to pay more to reduce the probability of a painful death than a painless one. And that is what the results in Table 2 illustrate, with a mean WTP of $715 in the qualitative scope test, which is higher than the base case estimate of $676. The experiment with the external benefit (one additional dog saved) also shows a mean WTP larger than in the base case.

Dog age and the dog viewed as a companion showed the hypothesized positive relationship in only two of the four models; expected years of life had the expected positive relationship in all four models. Having insurance or a prepaid plan has statistically significant positive coefficients in three of the four models. Although consistently positive, the coefficient of living alone was only statistically significant in one model. Turning to the perceptional variables, all the coefficients are positive and statistically significant as expected. That is, viewing the influenza risk as likely, seeing a vaccine as plausible, and believing that local governments should mandate dog vaccinations all positively affect mean WTP.

The standard errors of mean WTP vary across the models. The larger sample size accounts for the substantially smaller standard error for the base case model presented in the first column. Adding or subtracting two standard errors yields a range of mean WTP in the base case from about $500 to about $900, which translate into a range for VSDL of between $5000 and $9000.

6 Dogs that did not bark

Having more than one dog does not appear to affect WTP. Although not shown, we investigated the robustness of the models to additional variables. In general, their coefficients were not statistically significant, and more importantly, their inclusion did not substantially change the estimate of mean WTP. The additional variables were: keeping other pets or cats; respondent age and the square of respondent age; retired or student status; respondent gender; whether the dog was obtained from a breeder; location of household in an urban or rural area; number of children in the

household; presence of a child under three or under five years of age; an estimate of risk aversion based on a response to question about the willingness-to-purchase a gamble; and an indicator of the attention of the respondent to questions.

The relative absence of demographic effects on mean WTP suggests that valuations of mortality risks to dogs depend on unobserved rather than the commonly observed respondent characteristics. On the one hand, these unobserved characteristics contribute to larger standard errors in the estimates of WTP. On the other hand, they allow the estimates of mean WTP to be applied broadly, that is, without adjustments for the demographic characteristics of dog keepers.

7 Valuation

The last two rows of Table 2 show the mean VSDLs and mean VDLYs for all models. The base case yields a mean VSDL of $6700 and a mean VDLY of $1230. The quantitative scope test, which involves a smaller reduction in mortality risk than the base case, yields a mean VSDL of $10,050 and a mean VDYL of $1880.

These valuations depend on two crucial assumptions. First, the upper bound of the integration to determine the mean WTP is theoretically infinite, but for both practical reasons and concern that it is unrealistic to assume that individuals would actually be willing to pay very large sums for the mortality reduction, we limited the integration to $15,000. Nonetheless, in the base case analysis with recoding for certainty, about 14 % of respondents offered a bid of between $2500 and $3000 were willing to purchase the vaccine. Consequently, the logistic model puts some probability on the acceptance of bids much higher than $3000. We cannot determine if this "fat tail" is an artifact of our model or true reflection that some respondents indeed have very high WTP to avoid mortality risk for their dogs. We note that Kirk (2019) found respondents (10 out of 190) who claimed that they would pay very large amounts (over $100,000) for surgery to save a pet dog, which, although not directly comparable to WTP for risk reductions, suggests that some people may actually be in the tail of the distribution.

Second, as described above, we made the now common assumption that in the valuation of private goods, only very certain bid acceptances should be counted as

Table 3 Sensitivity of value of statistical dog life (dollars) to limits of integration and recoding for certainty.

Integration limit	Accept without recoding	Accept if certainty 9 or 10
$10,000	9260	5010
$15,000	12,910	6760
$20,000	16,230	8320

such. In our base case analysis, we recoded acceptances as rejections if the respondent did not express an 8 or higher on 0- to 10-point certainty scale. It is reasonable to consider the possibility that the recoding is incorrect and acceptances should be taken at face value.

Table 3 assesses the implications of these two assumptions. The rows show the mean VSDLs resulting from both higher and lower upper limits of integration in the calculation of mean WTP, and the columns show the difference between our recoding for certainty and no recoding for certainty. Comparing rows, we see that mean VSDL increases as the upper limit of integration increases, but at a decreasing rate. Comparing columns, it is clear that not recoding for certainty results in mean VSDLs that are almost double those based on recoded data.

As noted, respondents who viewed exposure to the influenza risk as likely and vaccination against it plausible were more likely to accept bids and therefore had higher mean WTPs. We created an indicator variable that takes the value 1 if the respondent saw the influenza exposure as likely and the vaccine as plausible and 0 otherwise. We interpret this variable as indicating receptivity to the elicitation. That is, we hypothesize that receptive respondents are more likely to be interpreting the elicitation as if it were an actual choice than non-receptive respondents.

Table 4 explores the implications of receptivity and viewing the dog as a companion on mean VSDL and VDLY in the base case model. The row comparisons show that companionship modestly increases the mean VSDL and VDLY. The column comparisons show that receptive respondents had mean VSDLs and VDLYs more than double the magnitudes of those who were not responsive. These much larger values would be more appropriate shadow prices if receptive respondents do indeed interpret the elicitation more as if it were a real choice.

Our survey experiments do not provide us with a way to determine if more weight should be placed on the mean VSDLs and VSLYs of receptive respondents. To facilitate use of our results by those who wish to make different assumptions and value dogs with different characteristics, we estimated the descriptive regressions shown in Table 5. The dependent variables are the VSDLs and VSLYs of the combined base case and income-primed respondents (column 1 of Table 2). The explanatory variables are whether or not the dog is viewed as a companion, the expected number of remaining years of life of the dog, the age of the dog, and whether or not the respondent is receptive to the elicitation. To facilitate use of our estimates in regulatory analysis, we estimate the regressions for the mean VDLY with discount rates of 3 and 7 %, as well as the preferred 3.5 %.

To illustrate how the results of these descriptive regressions could be used in practice, consider a case where an analyst would like an estimate of the VSDL under two scenarios, one where the dog is viewed as a companion and a second where it is not. For purposes of this exercise, assume that the analyst is using our results to estimate a

Table 4 Value of statistical dog life (VSDL) and value of a dog life-year (VDLY) for receptiveness and companionship (dollars).

	Not receptive (overall means: 6040/1090)	Receptive (overall means: 12,700/2410)
Not companion		
VSDL (overall mean: 6300)	5570	12,350
VDLY (overall mean: 1140)	990	2430
Companion		
VSDL (overall mean: 7190)	6470	13,010
VDLY (overall mean: 1320)	1180	2400

Table 5 Descriptive value of statistical dog life (VSDL) and value of a dog life-year (VDLY) regressions based on companionship, dog age, dog expected life, and respondent receptivity.

	VSDL ($)	VDLY ($)	VDLY ($)	VDLY ($)
		$d = 0.03$	$d = 0.035$	$d = 0.07$
Dog viewed as companion	830 (210)	160 (58)	160 (58)	180 (62)
Expected years of life	290 (34)	−110 (9.1)	−110 (9.2)	−100 (9.8)
Age of dog	96 (34)	43 (9.2)	43 (9.2)	46 (9.8)
Receptivity of respondent	6650 (340)	1370 (93)	1390 (93)	1540 (100)
Constant	2530 (480)	1630 (130)	1640 (130)	1690 (140)
N	1836	1836	1836	1836
R^2	0.21	0.25	0.25	0.23

Note: Standard errors in parentheses adjacent to coefficient estimate.

VSDL for a newborn puppy with a life expectancy of 13 years and where the survey respondent was receptive to the valuation scenario. To estimate the VSDL of a companion animal in this case, the analyst would simply add the relevant coefficients from the descriptive regressions. In particular, the analyst would add the coefficients on:

  (i)   the constant term ($2530);
 (ii)   the receptivity indicator ($6650);
(iii)   the expected years of life measure multiplied by 13 ($290 × 13 = $3770); and
(iv)   the companion indicator ($830).

This exercise produces a VSDL estimate for a companion dog of $13,780. The estimate for a non-companion dog would be $830 lower, or $12,950. To recover an estimate of VDLY, the analyst would apply a similar procedure to the regression results in the column with their preferred discount rate. More generally, the results in Table 5 can be used to generate estimates of either the VSDL or VDLY under alternative assumptions about any of the covariates included in the regressions.

8 Conclusion

Ample evidence – ranging from purchases of pet supplies to veterinary bills – demonstrates that Americans value their pet dogs. But, how much are they valued? That is, what is an appropriate shadow price for the life of a pet dog? As far as we know, no studies have attempted to answer this question using appropriate revealed or stated preference methods. In this study, we apply the latter to provide a plausible VSDL for use in cost-benefit analysis, tort cases, and divorce proceedings. Our direct estimate of the VSDL is $6760. However, taking account of the receptivity of respondents to the risks presented in the elicitation and the possibility that recoding for certainty is not appropriate in this context, as well as the result of the quantitative scope test, our direct estimate is likely too low. Therefore, we recommend setting the VSDL to $10,000, a very round number that both reflects our overall interpretation of the results of our analysis and conveys that we are providing only a first estimate.

Although there remain critics of the use of the VSL, most economists and regulatory analysts have come to accept its use as appropriate and necessary for comprehensively assessing impacts in cost-benefit analyses. An important factor in the acceptance of the VSL is its basis in the willingness of people to pay to avoid mortality risks that they themselves face. As our estimate of the VSDL is based on the willingness-to-pay of dog keepers – as opposed to the dogs themselves – to avoid mortality risks, we anticipate that, ironically, some who accept the VSL may reject the VSDL! We note, however, that our estimate is three or four times larger than the value of dog life used by the FDA in its rulemaking regarding requirements for animal food manufacturing under the Food Safety Modernization Act (FDA, 2015). We also note that this objection would apply to using a VSL for children because they do not participate in the labor markets that provide the most common basis for estimating the VSL, or contingent valuation surveys to estimate the value of species preservation. Indeed, contingent valuations typically find that parents are willing to pay substantially more to reduce mortality risks for their children than they are for reductions in mortality risks for themselves (see, for example, Hammitt & Haninger, 2010).

Although we have confidence in our estimate, both because it is based on a representative national sample of dog owners and because it employs conventional CVMs, it is only a first estimate. It demonstrates the feasibility of using contingent valuation surveys to estimate the VSDL. As with stated preference studies in general, replications are desirable to strengthen confidence in results. We hope to see others provide those replications. It would also be valuable to work toward estimating VSDL using revealed preference data, with information on households' veterinary expenditures representing a possible avenue for doing so. And, of course, we are sure cat keepers would be interested in the VSCL!

Appendix

Table A1 Representativeness of sample in terms of frequency of dog names.

	Female names				Male names		
Full sample	**Rover[a]**	**Sample with insurance**	**Embrace Pet Insurance[b]**	**Full sample**	**Rover[a]**	**Sample with insurance**	**Embrace Pet Insurance[b]**
Bella	Bella	Bella	Bella	Max	Max	Max	Max
Daisy	Lucy	Bailey	Luna	Buddy	Charlie	Buddy	Charlie
Molly	Luna	Daisy	Lucy	Rocky	Cooper	Lucky	Buddy
Sadie	Daisy	Ginger	Daisy	Bear	Buddy	Bear	Cooper
Lucy	Lola	Sadie	Lola	Charlie	Jack	Jack	Rocky
Lily	Sadie	Chloe	Molly	Toby	Rocky	Buster	Bear
Maggie	Molly	Coco	Sadie	Lucky	Duke	Rocky	Milo
Princess	Bailey	Maggie	Chloe	Jack	Bear	Milo	Duke
Chloe	Maggie	Nala	Coco	Milo	Tucker	Zeus	Zeus
Sophie	Stella	Princess	Bailey	Duke	Oliver	Chance	Toby
				Overlap			
6		6		7		5	

[a] https://www.rover.com/blog/dog-names/.
[b] https://www.embracepetinsurance.com/waterbowl/article/most-popular-dog-names-of-2018.

Table A2 Sample summary statistics.

Characteristics	N	Mean	Std. dev.	Min.	Max.
Female	4974	0.508	0.5	0	1
Age	4974	46.15	16.8	18	89
Hispanic	4974	0.149	0.356	0	1
White	4974	0.731	0.444	0	1
Black	4974	0.099	0.299	0	1
Other race	4974	0.17	0.376	0	1
Ln of bid	4975	6.99	0.99	1.609	8.006
Income FPL	4915	3.33	2.51	0.114	16.813
Dog viewed as companion	4973	0.514	0.5	0	1
Expected years of life	4975	8.45	4.17	0.1	20
Age of dog (years)	4975	6.14	4.04	0	28
Insurance or prepaid plan	4975	0.245	0.43	0	1
Lives alone	4975	0.239	0.427	0	1
More than one dog	4975	0.407	0.491	0	1
Influenza risk likely	4975	0.158	0.365	0	1
Vaccination plausible	4975	0.517	0.5	0	1
Vaccination should be mandatory	4975	0.378	0.485	0	1

Abbreviation: FPL, Federal Poverty Line.

Table A3 Sample summary statistics for respondents' recoded to "no" based on: WTP vote = yes, uncertainty (certainty <8).

Characteristics	N	Mean	Std. dev.	Min.	Max.
Female	989	0.549	0.497	0	1
Age	989	39.92	16.73	18	89
Hispanic	989	0.201	0.401	0	1
White	989	0.663	0.473	0	1
Black	989	0.139	0.346	0	1
Other race	989	0.198	0.399	0	1
Ln of bid	989	6.82	1.089	1.609	8.006
Income FPL	989	3.265	2.56	0.114	16.813
Dog viewed as companion	989	0.488	0.50	0	1
Expected years of life	989	9.00	4.18	1	20
Age of dog (years)	989	5.28	3.67	0	23
Insurance or prepaid plan	989	0.382	0.49	0	1
Lives alone	989	0.148	0.355	0	1
More than one dog	989	0.418	0.493	0	1
Influenza risk likely	989	0.209	0.407	0	1
Vaccination plausible	989	0.597	0.491	0	1
Vaccination should be mandatory	989	0.589	0.492	0	1

Abbreviation: FPL, Federal Poverty Line.

References

American Veterinary Medical Association. 2019. Canine Influenza. Available at https://www.avma.org/KB/Resources/Reference/Pages/Canine-Influenza-Backgrounder.aspx. (accessed June 25, 2019)

APPA. 2018. Pet Industry Market Size & Ownership Statistics. Available at http://www.americanpetproducts.org/press_industrytrends.asp. (accessed June 18, 2018)

Blumenschein, Karen, Glenn C. Blomquist, Magnus Johannesson, Nancy Horn, and Patricia Freeman. 2007 "Eliciting Willingness to Pay Without Bias: Evidence from a Field Experiment." *Economic Journal*, 118(525): 114–137.

Boardman, Anthony E., David H. Greenberg, Aidan R. Vining, and David L. Weimer. 2018. *Cost-Benefit Analysis: Concepts and Practice*. New York, NY: Cambridge University Press.

Buckland, Stephen T., Douglas C. MacMillan, Elizabeth I. Duff, and Nick Hanley. 1999. "Estimating Mean Willingness to Pay from Dichotomous Choice Contingent Valuation Studies." *Journal of the Royal Statistical Society: Series D (The Statistician)*, 48(1): 109–124.

Centers for Disease Control and Prevention. 2019. Key Facts About Canine Influenza (Dog Flu). Available at https://www.cdc.gov/flu/other/canine-flu/keyfacts.html. (accessed June 25, 2019)

Champ, P. A., Bishop, R. C., Brown, T. C., and McCollum, D. W. 1997. "Using donation mechanisms to value nonuse benefits from public goods." *Journal of Environmental Economics and Management*, 33(2): 151–162.

Flores, Nicholas E., and Richard T. Carson. 1997. "The Relationship Between the Income Elasticities of Demand and Willingness to Pay." *Journal of Environmental Economics and Management*, 33(3): 287–295.

Food and Drug Administration. 2015. "Current Good Manufacturing Practice, Hazard Analysis, and Risk-Based Preventive Controls for Food for Animals. Final Rule." *Federal Register*, 80(180): 56170–56356.

Haab, Timothy C., and Kenneth E. McConnell. 2002. *Valuing Environmental and Natural Resources: The Econometrics of Non-Market Valuation*. Northampton, MA: Edward Elgar Publishing.

Hammitt, James K., and Kevin Haninger. 2010. "Valuing Fatal Risks to Children and Adults: Effects of Disease, Latency, and Risk Aversion." *Journal of Risk and Uncertainty*, 40(1): 57–83.

Hanemann, Michael, and Barbara Kanninen. 1999. "Statistical Analysis of Discrete Response CV Data." In *Valuing Environmental Preferences*, edited by Ian J. Bateman, and Kenneth G. Wells, 300–441. New York, NY: Oxford University Press.

Hodgson, Kate, Luisa Barton, Marcia Darling, Viola Antao, Florence A. Kim, and Alan Monavvari. 2015. "Pets' Impact on Your Patients' Health: Leveraging Benefits and Mitigating Risk." *Journal of the American Board of Family Medicine*, 28(4): 526–534.

Inoue, Mai, A. Hasegawa, Y. Hosoi, and K. Sugiura. 2015. "A Current Life Table and Causes of Death for Insured Dogs in Japan." *Preventive Veterinary Medicine*, 120(2): 210–218.

Kirk, Colleen P. 2019. "Dogs Have Masters, Cats Have Staff: Consumers' Psychological Ownership and their Economic Valuation of Pets." *Journal of Business Research*, 99 (June): 306–318.

Martin, Logan. 2011 "Dog Damages: The Case for Expanding the Available Remedies for The Owners of Wrongfully Killed Pets In Colorado." *University of Colorado Law Review*, 82 (3–4): 921–957.

Nestle, Marion. 2008. *Pet Food Politics: The Chihuahua in the Coal Mine*. Berkeley, CA: University of California Press.

Robinson, Lisa A. 2007. "How US Government Agencies Value Mortality Risk Reductions." *Review of Environmental Economics and Policy*, 1(2): 283–299.

Schläpfer, Felix. 2006. "Survey Protocol and Income Effects in the Contingent Valuation of Public Goods: A Meta-Analysis." *Ecological Economics*, 57(3): 415–429.

Schwarz, Peter M., Jennifer L. Troyer, and Jennifer Beck Walker. 2007. "Animal House: Economics of Pets and the Household." *B.E. Journal of Economic Analysis & Policy*, 7(1): 1–25.

U.S. Department of Health and Human Services. 2019. Poverty Guidelines for 2019. Available at https://aspe.hhs.gov/poverty-guidelines. (accessed January 11, 2019)

Viscusi, W. Kip. 2018. *Pricing Lives: Guideposts for a Safer Society*. Princeton, NJ: Princeton University Press.

Viscusi, W. Kip, and Joseph E. Aldy. 2003. "The Value of a Statistical Life: A Critical Review of Market Estimates Throughout the World." *Journal of Risk and Uncertainty*, 27(1): 5–76.

Corrigendum

Deven Carlson, Simon Haeder, Hank Jenkins-Smith,
Joseph Ripberger, Carol Silva and David Weimer

Monetizing Bowser: A Contingent Valuation of the Statistical Value of Dog Life – Corrigendum

In the original publication of Carlson et al. (2019), the department for Simon Haeder's affiliation was incorrect. The correct affiliation is listed below:

Simon Haeder, School of Public Policy, Pennsylvania State University, University Park, PA, USA.

Reference

Carlson, D, S Haeder, H Jenkins-Smith, J Ripberger, C Silva, and D Weimer. 2019. "Monetizing Bowser: A Contingent Valuation of the Statistical Value of Dog Life." *Journal of Benefit-Cost Analysis*, doi: 10.1017/bca.2019.33.