



ELSEVIER

Contents lists available at [ScienceDirect](http://www.sciencedirect.com)

## Critical Perspectives on Accounting

journal homepage: [www.elsevier.com/locate/cpa](http://www.elsevier.com/locate/cpa)



# Sustaining diversity in social and environmental accounting research

Robin W. Roberts\*, Dana M. Wallace

Kenneth G. Dixon School of Accounting, University of Central Florida, Orlando, FL 32816, United States

### ARTICLE INFO

#### Keywords:

Social accounting  
Environmental accounting  
Corporate social responsibility  
Sustainability  
Quantitative research

#### Mots clés:

Critique  
Environnemental  
Social

#### Palabras clave:

Crítica  
Ambiental  
Social

### ABSTRACT

During its relatively brief, 40-year life as a recognized field of inquiry (Owen, 2008), research in social and environmental accounting (SEA) has witnessed its fair share of struggles within both the mainstream and critical accounting literature. Only recently, the elite mainstream academic journals in the United States have (re)discovered SEA-related work on corporate social responsibility, and in a vast majority of that work, earlier SEA studies are either not acknowledged (e.g., Elliott, Jackson, Peecher, & White, 2014) or are dismissed as irrelevant to the discussion at hand (e.g., Moser & Martin, 2012). Critical accounting research has been more welcoming generally to SEA topics, although there has been near constant tension between the reformist approach taken in many SEA studies and the more radical tenor understandably present in critical research (e.g., Spence, 2009; Tinker et al., 1991). At certain points in the development of SEA research, common ground has been found (Tinker & Gray, 2003). Grappling with these dilemmas seems especially acute for quantitative SEA work that follows an objectivist/positivist research tradition, often facing increasing methodological hurdles from the elite mainstream, and/or a rejection of fundamental assumptions by critical theorists.

The purpose of this paper is twofold. First, we offer support for sustaining diversity in SEA research by discussing the potential for quantitative SEA research projects to substantively challenge mainstream conceptions of SEA. Second, in order to promote quantitative SEA research we present a literature review that informs current and potential quantitative SEA scholars of recent developments in this stream of research, focusing primarily on the methodological requirements present in related mainstream quantitative research. Although admittedly partial and selective in its presentation, through this commentary we aim to promote continued support of quantitative SEA research within the critical accounting community and to help enable non-mainstream quantitative SEA researchers to disarm methodological criticisms from elite mainstream sources.

© 2015 Published by Elsevier Ltd.

\* Corresponding author.

E-mail address: [rroberts@bus.ucf.edu](mailto:rroberts@bus.ucf.edu) (R.W. Roberts).

8 “There’s nothing in the middle of the road but yellow stripes and dead armadillos.”

9 Jim Hightower, former Texas agriculture commissioner (1997)

## 10 1. Introduction

11 **Q3** Its modicum of journal publication presence notwithstanding (for evidence see literature reviews by Gray, Kouhy, &  
12 Lavers, 1995 and Owen, 2008), large-sample, quantitative social and environmental accounting (SEA) research that  
13 challenges mainstream conceptions of SEA is often stuck between the proverbial rock (i.e., elite U.S. mainstream accounting  
14 research) and hard place (i.e., critical accounting research). The “rock” metaphor applies to mainstream accounting research  
15 because quantitative SEA researchers whose theoretical approach or empirical results seriously erode the business case for  
16 corporate social responsibility (CSR) most likely find an impenetrable wall of editorial and/or anonymous reviewer “stone”  
17 between the paper and publication.<sup>1</sup> The “hard place” metaphor applies to critical accounting research because positivist  
18 assumptions that support the theoretical and methodological foundation for large-sample quantitative research are seldom  
19 commensurate with the fundamental assumptions that support critical studies (Burrell & Morgan, 1979).<sup>2</sup> Even when there  
20 is a shared practical concern among quantitative SEA and critical SEA researchers (e.g., the protection of the natural  
21 environment), attempts to find a constructive way forward for a quantitative SEA research project, such as through a multi-  
22 paradigm inquiry, become extremely difficult for quantitative SEA researchers because they are not typically well-versed in  
23 critical social theory (see Lewis & Grimes, 1999 for a general discussion of these challenges).

24 Similar observations concerning the pitfalls associated with undertaking accounting research that operates on either  
25 center-margin have been offered before, and in much more convincing detail, by both mainstream (Merchant, 2008) and  
26 critical (Spence, 2009; Tinker, Lehman, & Neimark, 1991) accounting researchers. Mentioning them here is not intended to  
27 engender any academic sympathy. Given that quantitative SEA research is often considered by both mainstream and critical  
28 groups to operate in the “middle of the road”, it comes as little surprise that a non-mainstream quantitative SEA project leads  
29 to either a “rock” or a “hard place”, or at some point in the publication process, is “run over” from either direction.

30 Of course, SEA research is not unique in this respect. Debates about an academic discipline’s support or resistance to the  
31 inclusiveness of multiple paradigms have been witnessed time and time again in sister disciplines, for example in sociology  
32 (Bryman, 1984), information systems (Robey, 1996), and as recently as 2007 in mainstream accounting (Hopwood, 2007). All  
33 of this said, it is our observation (and probably that of many others) that the editors of *Critical Perspectives on Accounting* (CPA)  
34 have an admirable history of research inclusiveness. We purport that this has been true since its early inception (e.g., Cooper  
35 & Zeff, 1992) and can be most recently and relevantly referenced here by its thematic issue on Accounting and the  
36 Environment (*Critical Perspectives on Accounting*, Volume 24, Issue 6 (2013)). In relation to all of these efforts by CPA, we  
37 admire the editors’ paradigm tolerance when developing thematic issues and also admire the willingness of CPA thematic  
38 issue lead authors (i.e., brave academic souls) to submit their work to public commentary by researchers who may hail rather  
39 enthusiastically from other research traditions. It is with this background and in this spirit of tolerance and inclusiveness  
40 that we offer our commentary. In the space that follows, we explain our support for non-mainstream quantitative SEA  
41 research in the critical accounting community, provide a primer in quantitative SEA research that helps disarm  
42 methodological criticisms potentially leveled by the mainstream accounting community, and draw general conclusions from  
43 our work.

## 44 2. Supporting non-mainstream quantitative SEA research in the critical accounting community

45 Critical accounting research and SEA research are both, at their core, political. This observation has been stated before,  
46 more generally about accounting research (Tinker, Neimark, & Merino, 1982) as well as more specifically about SEA research  
47 (Gray et al., 1995; Spence, 2009). Often the question for SEA researchers then becomes one of how *explicitly* political a study  
48 should be, and whether or not a failure to be explicit about politics implies support of the status quo (Lehman, 2001). For  
49 some in the critical accounting community, explicitly rejecting the status quo seems necessary in order to define worthy SEA  
50 research (Spence, Husillos, & Correa-Ruiz, 2010). While these discussions and debates are steeped in social theory, they also  
51 are very relevant to the research agendas of non-mainstream quantitative SEA researchers who anchor their own scholarly  
52 work in positivist traditions and often work within the bounds of mainstream conceptions of society. As a community that at  
53 its core argues for planetary sustainability and social justice, non-mainstream SEA researchers must continue to examine the  
54 ultimate potential policy outcomes associated with their approach to SEA research. The heart of the debate, for our purposes,  
55 appears to center on whether non-mainstream quantitative SEA research that can be criticized for being reformist is, in  
56 essence, counter-productive (Archel, Husillos, & Spence, 2011), further perpetuating the legitimacy of the status quo. These  
57 conclusions are disquieting, but also conclusions that can be extrapolated to include almost all types of SEA research. The

<sup>1</sup> We view *Accounting, Organizations and Society* as an exemplary exception to the rule. See Gray (2002) for a detailed discussion of the journal’s contribution to SEA research.

<sup>2</sup> We say *seldom* because, as proposed later in the paper, we believe there are potential connections between positivist and critical SEA research, as discussed more generally by York and Clark (2006).

academic privilege granted to SEA researchers in Western democracies has generally provided the freedom to reject the status quo as well as attempt to reform it.

We believe that CPA, consistent with its history, should continue to make room for non-mainstream quantitative SEA research, which may operate in the “middle of the road” but tends to veer “left” on key issues of immediate relevance to the critical and more general SEA research community. Our belief is rooted in two key considerations. First, non-mainstream SEA research can advocate for immediate reforms that align with the pressures critical SEA researchers seek to apply to powerful interest groups (e.g., Cho, Chen, & Roberts, 2008). This stream of SEA research also can provide direct counterpoints to mainstream interpretations of quantitative analyses dealing with current social and environmental accounting policies and corporate SEA disclosures that tend to reify business case notions of CSR and sustainability. Second, SEA research in the positivist tradition is not, by definition, reformist. Quantitative SEA research can be used to repudiate functionalist mainstream ideas, aligning with a political economy framework (e.g., Dwyer & Roberts, 2004; Roberts & Bobek, 2004). Thus, from our perspective the primary roles of non-mainstream quantitative SEA researchers are to (1) carefully execute positivist studies that challenge the findings of mainstream SEA research and (2) advance non-mainstream quantitative SEA research by introducing and empirically testing new theoretical approaches that can provide convincing, alternative explanations for observed organizational or market level social and environmental activities.

We understand that these statements represent our opinions and may not be shared by other non-mainstream or critical SEA researchers – this is our commentary. Taking our description of the primary roles of non-mainstream quantitative SEA research as given however, we want to delve more deeply into two key issues related to our collective abilities to fulfill these primary roles; (1) finding alternative literatures that resonate with our stance on SEA and (2) understanding mainstream positivist methodologies well enough to disarm their criticisms. These issues are based on our observations and experiences while working in the “middle of the road” (i.e., non-mainstream) between the mainstream and critical SEA research communities and trying not to get “run over”. We acknowledge that there are other pressing issues related to SEA research, but we believe that addressing these two issues successfully in non-mainstream SEA work is vital to seeing our primary goals achieved through publication.

### 3. Finding critical relevance in non-mainstream quantitative SEA research

For the most part, mainstream quantitative SEA researchers have it easy theoretically speaking. The social science assumptions of order and objectivity (i.e., sociological positivism) and narrow assumptions of traditional neoclassical economics are maintained hypotheses in most of this stream of research. Brute positivism does not require refined theory. The political nature of these meta-theoretical assumptions are almost never even acknowledged, much less articulated in U.S. elite mainstream quantitative SEA research or mainstream accounting research in general (Arnold, 2009). The researchers and their targeted audience who work within this genre of accounting research are assumed to hold a substantially similar worldview if only implicitly; so similar that fundamental assumptions appear noncontroversial or perhaps trivial. This apparent lack of reflection seems to stem from their homogeneous and narrow doctoral training (Schwartz, Williams, & Williams, 2005) or the small world nature of their communication structures (Bonner, Hesford, Van der Stede, & Young, 2012). The research terrain in non-mainstream and critical SEA research is substantially different. Multiple theoretical perspectives are forwarded that provide a rich set of alternative conceptions of SEA. This terrain has been mapped and debated extremely well in a number of studies (e.g., Gray, Owen, & Adams, 2010; Lehman, 2001; Spence et al., 2010).

From our perspective, the crux of the dilemma for any SEA researcher operating outside the mainstream is in determining the best strategy for influencing broad-based academic debate on critical issues of planetary sustainability and social justice. This situation returns us to our dilemma concerning non-mainstream quantitative SEA research being stuck between the “rock” of mainstream SEA research and the “hard place” of critical SEA research; operating in the “middle of the road” and risking becoming a “dead armadillo”. With theoretical debate virtually nonexistent in elite mainstream quantitative SEA research and that research stream being well entrenched in the status quo, we think that non-mainstream quantitative SEA researchers are left with three viable and worthwhile options that can continue to create research that contributes to our collective aspirations to improve planetary sustainability and social justice. They are:

- (1) Act theoretically agnostic and challenge U.S. elite mainstream results within the boundaries of their own research traditions and language (be real thorns in their side).
- (2) Develop and/or import theories from alternative literatures that have some elements in common with the broader mainstream (attempt to initiate substantive, relevant debate within an acceptable level of shared understanding without explicitly renouncing the status quo).
- (3) Advance critical SEA research using objectivist methodologies (broaden the purview of political economy perspectives).

These options are not new and can be evidenced through the individual research agendas of many non-mainstream quantitative SEA researchers. Guidry and Patten (2012) provide an excellent example of option one. This study uses a mainstream approach to SEA research to challenge previous studies that supported neoclassical economics-based explanations for the inclusion of financial control variables in environmental disclosure models. The paper operates within the fundamental methodological assumptions of mainstream SEA research, yet attempts to provide an alternative

perspective for environmental disclosure researchers (i.e., legitimacy theory as opposed to voluntary disclosure theory) – definitely a “thorn in their side”. Many non-mainstream quantitative SEA studies fit within option two. From our perspective, the critical differentiation between mainstream and non-mainstream quantitative SEA research considered to operate in option two centers on whether or not the research is fundamentally managerialist in nature. For instance, Roberts (1992), focusing on the strategic nature of CSR disclosures, resides outside of the critical accounting community while Neu, Warsame, and Pedwell (1998), forwarding the ideas of impression management theory, fits well within option two, as does Cho and Patten (2007) and Cho, Guidry, Hageman, and Patten (2012). Quantitative, non-mainstream SEA research that fits within the definition of option three is underdeveloped and has focused more broadly on the discipline (e.g., Roberts & Bobek, 2004) and profession (e.g., Dwyer & Roberts, 2004) of accounting rather than on CSR areas of SEA research.

There are studies published in related disciplines that can help further develop critical quantitative SEA work using a political economy perspective. For example, work in sociology by Richard York and his colleagues articulate common ground between positivism and Marxism (York & Clark, 2006), empirically test alternative theories, including a political economy perspective, regarding the environmental consequences of modernity (York, Rosa, & Dietz, 2003), and challenge the reformist perspective of ecological modernization theory (York & Rosa, 2003). Early theoretical work on the “treadmill of production” (Schnaiberg, 1980) has been supported empirically using positivist research methods (Gould, Pellow, & Schnaiberg, 2004). We see this work to be promising as a way forward for future critical quantitative research by non-mainstream SEA scholars.

A constant across all three options for quantitative, non-mainstream SEA researchers is the need to perform research that is methodologically sound as viewed by the community of scholars who are being engaged. This is especially true if the research seeks to engage with elite mainstream research on at least some of its own terms (option one or option two). Thus, we devote a good bit of our commentary to presenting an overview of methodological issues for quantitative, non-mainstream SEA researchers to consider when undertaking similar research. Methodological rigor in quantitative SEA research is a moving target, but we think our summary can be helpful. With that in mind, we now turn to an analysis of key methodological issues that non-mainstream SEA researchers should consider when undertaking quantitative research.

#### 4. Disarming (and potentially engaging with) the elite mainstream: methodological considerations in quantitative SEA research

Richardson (2015) posits that there is significant potential to advance the critical accounting project using quantitative methods. We argue this potential holds perhaps even more strongly for critical and non-mainstream SEA research. Gray and Milne (2015) stress that the SEA community should be more concerned with the research problem first and let the appropriate research methods follow. Both commentaries rightfully emphasize that theoretical considerations need much more attention than they are currently afforded across all genres of SEA research, especially the elite mainstream. We agree with the sentiments expressed in these commentaries as well as the similar sentiments expressed by Patten (2015). A narrow view of acceptable research methods and the availability of archival data should not dictate the types of SEA research questions that can and should be investigated.

We want to make clear that the observations of our fellow commentators resonate with us as well. The purpose of the following discussion is to point out methodological issues or obstacles that may inhibit critical or non-mainstream quantitative SEA researchers from engaging substantively with a large segment of mainstream research. The standardization of the quantitative research process in elite accounting journals has led to the sophistication of statistical and econometric tools that allow researchers operating within this paradigm to more formally evaluate prior work, potentially through a different theoretical lens. Thus, the empirical testing of alternative explanations, through use of a standardized quantitative research process, is one way in which the non-mainstream and critical SEA research community can attempt to engage the elite mainstream in a substantive discussion of CSR topics. In the next few sections, we describe the assumptions of quantitative, archival mainstream accounting research, summarize the re-emergence of SEA research in the elite mainstream, and point out key quantitative research tools that should be considered when undertaking non-mainstream or critical quantitative SEA research aiming to engage with the mainstream community.

##### 4.1. Assumptions of quantitative, archival research

Quantitative SEA research, particularly elite mainstream SEA research, often uses financial markets as a basis from which to study substantive SEA issues. Some examples of capital markets studies on SEA topics include investigations of: the relation between firm environmental performance and financial performance (Al-Tuwaijri, Christensen, & Hughes, 2004; Clarkson, Li, Richardson, & Vasvari, 2011); the impact on abnormal returns of a firm’s inclusion in or deletion from a sustainability-focused stock index (Ramchander, Schwebach, & Staking 2012); the mitigating effect of CSR activity or environmental disclosure on a firm’s abnormal returns following a negative event (Blacconiere & Patten, 1994; Godfrey, Merrill, & Hansen, 2009); the relation between CSR activities and insider trading (Gao, Liscic, & Zhang, 2014); and the impact of carbon emissions and carbon disclosure on firm value (Matsumara, Prakash, & Vera-Munoz, 2014).<sup>3</sup>

<sup>3</sup> See Kothari (2001) for a review of mainstream capital markets accounting research.

173 The assumptions that underlie most market-related archival research, including quantitative SEA research, follow a  
174 narrow positivist/functionalist tradition and stem from the Efficient Market Hypothesis (EMH). The EMH asserts that  
175 financial asset prices fully reflect all available, relevant information (Fama, 1970).<sup>4</sup> Thus, as new information arises, it  
176 spreads rapidly and is incorporated into stock prices instantly. Market efficiency principles are the foundation of many  
177 mainstream SEA studies, including Matsumara et al. (2014), who document lower market values for firms with higher carbon  
178 emission levels, but higher market values for firms that disclose carbon emissions. Thus, the authors conclude, “. . .capital  
179 markets impound both carbon emissions and the act of voluntary disclosure of this information in firm valuations”  
180 (Matsumara et al., 2014). This conclusion is repeated often in mainstream quantitative SEA research – voluntary corporate  
181 disclosures provide incremental information as opposed to obfuscating environmental performance.

182 The Efficient Market Hypothesis is, however, highly controversial even within mainstream research. While many capital  
183 markets researchers continue to support the EMH, much criticism exists within the finance, accounting, and economics  
184 research communities, and several studies provide evidence that is inconsistent with the EMH (e.g., studies documenting the  
185 post-earnings announcement drift, Bernard and Thomas, 1990). Certain psychological “biases”, combined with the  
186 possibilities of noise trading, market imperfections, and features of the market microstructure, have prompted critics of the  
187 EMH to turn to other theories to help explain market movements (Malkiel, 2003). Likewise, researchers within the disclosure  
188 literature provide alternate theories to the neoclassical, economics-based voluntary disclosure theory (Cho & Patten, 2007).  
189 Nevertheless, many researchers, both within and outside of the SEA community, continue to conduct studies wherein the  
190 EMH assumptions are the basis of their research.

191 In order for all types of quantitative researchers to engage in meaningful discussions regarding SEA topics, an  
192 understanding of the basic assumptions underlying this type of research is essential. With a mutual understanding of this  
193 foundation, as well as acknowledgment of the potential shortcomings of such assumptions, we deem it possible for non-  
194 mainstream and critical quantitative researchers to contribute to a broad-based SEA literature. We are mindful, however,  
195 that the richness of such conversations depends foremost upon the shared motivation of the researchers, that is, their desire  
196 to better understand and advance social and environmental accounting.

#### 197 4.2. *The emergence of SEA research in the U.S. elite mainstream*

198 In general, non-mainstream quantitative SEA researchers incorporate into their work relevant theories from related  
199 disciplines (e.g., legitimacy theory, stakeholder theory, and institutional theory) as well as knowledge about the breadth of  
200 SEA work conducted over the past forty years. Whereas non-mainstream and critical SEA researchers concentrate on issues  
201 of planetary sustainability and social justice, the mainstream’s focus appears more concerned with an instrumental view of  
202 CSR and its relation to market measures of managerial performance and shareholder value creation (Gray, 2006). Of course,  
203 this is central to defining the difference between mainstream and non-mainstream CSR research. As Richardson (2015)  
204 observes, critical research must, however, have a baseline understanding of the mainstream in order to question their  
205 portrayal of “what is” and develop an alternative conception of “what could be”. While the mainstream can ignore non-  
206 mainstream research, it is important that our critiques of the mainstream demonstrate a keen understanding of their  
207 rationale and methodological approach to SEA research. The recent success of academic researchers publishing their CSR-  
208 related studies in elite U.S. mainstream accounting journals may provide an opportunity for SEA researchers to engage in  
209 relevant academic debates, although to date very few non-mainstream studies have been cited in these articles. In that spirit,  
210 and with the caveats mentioned above in mind, we offer a partial summary of the findings forwarded by this recent,  
211 mainstream CSR research.

212 First, several of these elite mainstream studies investigate CSR-related disclosure. They document that CSR report  
213 issuance is associated with lower analyst forecast error (Dhaliwal, Radhakrishnan, Tsang, & Yang, 2012) and higher earnings  
214 quality (Kim, Park, & Wier, 2012). Other research finds that firms initiating CSR reporting experience subsequent reductions  
215 in costs of capital, attract more institutional investors and analyst coverage, and are more likely to later raise equity capital  
216 (Dhaliwal, Li, Tsang, & Yang, 2011). Matsumara et al. (2014) find that carbon emissions (carbon emission disclosures) are  
217 negatively (positively) related to firm value. Moreover, Simnett, Vanstraelen, and Chua (2009) examine the determinants of  
218 CSR report assurance and find that firms seeking enhanced credibility are more likely to have their report assured.

219 Other recently published studies focus on CSR activities. Hoi, Wu, and Zhang (2013) document that irresponsible (or  
220 negative impact) CSR activities, such as safety controversies, substantial emissions, or accounting controversies, are  
221 associated with greater tax aggressiveness. Gao et al. (2014) provide evidence that executives at CSR-active firms are more  
222 likely to refrain from informed trading, suggesting managers at such firms are committed to social good. In a similar vein,  
223 Godfrey et al. (2009) find that firms engaged in institutional CSR activities – those aimed mostly at society at large –  
224 experience less shareholder wealth loss following bad news events. Another event study finds that additions to (deletions

<sup>4</sup> The EMH can be categorized into three “versions” – weak-, semi-strong-, and strong-form efficiency (Fama, 1970). Weak-form efficiency implies asset prices incorporate all historical information. Semi-strong efficiency asserts asset prices incorporate all publicly available information, including historical, current, and forecastable (future) information. Strong-form efficiency implies asset prices reflect all information, both public and private. Few researchers consider the strong-form of EMH realistic, and thus do not attempt to test it, but the semi-strong-form represents the accepted paradigm throughout most of the literature that tests the EMH (Jensen, 1978).

from) the Domini Social 400 index, an index of socially responsible firm stock, result in a positive (negative) share price response for the announcement firm (Ramchander et al., 2012).

As evidenced by these studies, the mainstream's level of interest in publishing papers on SEA topics has grown. While this recent "excitement" about SEA topics from the mainstream community is potentially a research fad and likely does not reflect earnest concerns about sustainability (Gray & Milne, 2015), the fact remains that the current climate provides the opportunity for the SEA community to engage the greater accounting academic community in discussions surrounding CSR topics. Such an opportunity is valuable because this type of exposure helps further the greater purpose of the SEA community – to promote planetary sustainability and social justice.

Thus, if quantitative SEA researchers at the very least recognize the benefits of engaging in (potentially via criticism of or contribution to) the mainstream CSR literature, the question arises: How can quantitative SEA researchers successfully engage? In order for the ideas of non-mainstream researchers to reach the mainstream literature, they must overcome several challenges – one of which includes overcoming the increasing methodological hurdles from the elite mainstream. Below, we provide insight into how quantitative researchers can contribute to the mainstream, non-mainstream or the critical SEA literature by highlighting key quantitative tools. We caution the reader that the tools and techniques discussed in the next part of our commentary are by no means necessary in every single quantitative, archival study. Instead, what follows is intended to inform non-mainstream quantitative SEA researchers of potential stumbling blocks and techniques to consider when conducting their research.

#### 4.3. Key quantitative tools

The specific research design choices made by non-mainstream quantitative SEA researchers will depend on whether they are undertaking research related to our previously defined option one (use mainstream approaches to challenge their findings), option two (use a broad range of alternative theories to provide more refined analyses), or option three (use political economy theories in objectivist research). In other words, the theoretical grounding of the research will dictate to a large extent how the research questions are formed, the data are selected, and the empirical tests are designed. These decisions are, of course, the initial building blocks of meaningful quantitative SEA research. Recent mainstream quantitative SEA research, although perhaps asking research questions that do not resonate with non-mainstream or critical SEA research, can inform us of quantitative research design tools that are helpful in our own research. Our discussion that follows calls for researchers to carefully consider the use of certain CSR data, alternate measures of variables, matched samples, instrumental variable methods, alternate samples, and economic significance interpretations.

Quantitative SEA researchers must foremost have a clear understanding of their data. Various CSR ratings agencies exist (e.g., Sustainalytics, KLD, Asset4, etc.), for instance, and is important for the researcher to ensure he or she understands how those ratings were composed and whether the ratings appropriately measure the underlying construct. Kim et al. (2012), for example, utilize KLD data to measure firm-specific CSR performance and examine its relation to earnings quality. The authors thoroughly describe the KLD data and explain their decision to exclude corporate governance-related ratings in their setting, a decision which appears to have been suggested by a reviewer (see Kim et al., 2012, footnote 12, p. 768). This is a fairly clear indicator that reviewers aim to ensure the researcher understands his or her data and is using it appropriately.

Next, it is becoming increasingly important to rule out alternate explanations for the study's results, as well as address potential biases within the research design. The majority of the well-cited, recently published CSR papers include entire sections that demonstrate that the researcher carefully considered other possible explanations for (and biases in) their study's results. One common consideration is whether the results are driven by a particular measure of the independent variable of interest, such as CSR performance. As mentioned above, Kim et al. (2012), use KLD ratings data for their CSR performance measure within the main analysis. In additional testing, they identify high CSR performing firms as those included in the Domini 400 Social Index and construct a matched-pair sample (explained further below) to re-examine the relation between CSR and earnings quality. Researchers also often consider alternate measures of the dependent variable. Hoi et al. (2013), Kim et al. (2012), and Dhaliwal et al. (2011) each consider alternate measures of tax aggressiveness, earnings quality, and the cost of capital, which is the dependent variable of interest in their respective studies.

Matching is another statistical tool often used by quantitative researchers, particularly to help better assess a treatment effect and to reduce the bias introduced by non-random sampling (Rubin, 1973). As an example, consider a study investigating the impact of S&P 500 membership on environmental performance. The researcher creates a matched sample by finding, for every treated (S&P 500 member) observation, a non-treated (non-S&P 500 member) observation with similar characteristics to form a matched pair. The researcher typically utilizes two or more characteristics, such as firm size, profitability, industry, and/or year. The goal of this approach is to generate a sample that includes pairs of observations that are quite similar in many aspects, except for the presence of the treatment (S&P 500 membership). Once the matched sample is constructed, the researcher then estimates the model of interest (an environmental performance regression in this example) using this matched pair sample. This technique reduces the concern that the treatment effect is due to confounding variables.<sup>5</sup> As a robustness test in their study examining the association between CSR reporting and analyst forecast

<sup>5</sup> Confounding variables are extraneous variables that are correlated with both the independent and the dependent variable and thus result in the correlated omitted variable bias (Woolridge, 2012).

accuracy, [Dhaliwal et al. \(2012\)](#) create a matched-pair sample. To do so, each CSR reporting firm is matched with a non-reporting firm from the same country and industry, closest in firm size by year. They show their results are robust to using this matched sample.

Further, propensity score matching is a more robust method of matching that quantitative accounting researchers frequently use ([Rosenbaum & Rubin, 1983](#)). With this technique, the researcher first estimates a logit or probit regression with the treatment effect as the dependent variable (i.e., S&P 500 membership, continuing with our earlier example) and independent variables that are known determinants of the treatment (possibly economic performance, firm size, age, industry, etc. in our example). From this first-stage regression, the researcher obtains propensity scores.<sup>6</sup> The researcher then matches each treated observation to a non-treated observation based on the distance between their propensity scores (i.e., those observations with the closest propensity scores are matched).<sup>7</sup> [Hoi et al. \(2013\)](#) utilize propensity score matching in their study that links irresponsible CSR activities with tax aggressiveness. They first generate predicted propensity scores for each firm-year using a model of the determinants of a firm engaging in a high level of negative, irresponsible CSR activity. Then, they match a treatment firm (one with a high level of negative CSR activities) to a non-treatment firm (one with a low level of, or no, negative CSR activities) by matching observations with the closest propensity scores. [Hoi et al. \(2013\)](#) then re-test the relation between negative CSR activities and tax aggressiveness using this matched sample. These matching techniques help mitigate the researcher's potential failure to consider certain firm characteristics that differ between treatment and non-treatment firms ([Dhaliwal et al., 2012](#)).

Next, self-selection bias often exists and is usually implicit in the choice and structuring of many quantitative SEA research questions. Selection arises when observations are not randomly sorted into groups (i.e., they select themselves into a group), which results in the potential for coefficient bias when using estimation procedures such as OLS regression ([Maddala, 1991](#)). [Lennox, Francis, and Wang \(2012\)](#) provide an example of how self-selection bias likely exists in a study examining whether management earnings forecasting ( $M$ , an indicator variable) affects the cost of capital. In this setting, management forecasting is endogenous, in that firms self-select (i.e., choose to issue management earnings forecasts) into the treatment group ([Lennox et al., 2012](#)). In order to account for this selection bias, [Heckman \(1997\)](#) developed a procedure whereby the researcher initially estimates a first-stage probit model with the treatment (a binary variable indicating whether the firm provides management forecasts in our example) as the dependent variable, estimates the inverse Mills' ratio from this regression, and includes the ratio as a control variable in the model of interest (cost of capital on forecasting).<sup>8</sup> Additionally, the researcher must identify exogenous independent variables used in the first-stage model that can be excluded from the second-stage model.<sup>9</sup> [Hoi et al. \(2013\)](#) consider that the association they examine between irresponsible CSR activities and tax aggressiveness may be due to firms self-selecting into the engagement in negative CSR activities, which is driven by other factors, such as political or societal pressure, or financial constraints. If they do not properly control for and/or capture these factors within their model, their results may reflect a self-selection bias. Thus, [Hoi et al. \(2013\)](#) use the two-stage Heckman procedure to correct for this potential bias and find their results are robust using this procedure.

The Heckman correction is just one example of an instrumental variable method. Other instrumental variable approaches exist, such as two- and three-stage-least-squares and simultaneous equations models, to help mitigate endogeneity concerns.<sup>10</sup> These models attempt to address the correlated omitted variable bias and/or scenarios in which the outcome and explanatory variables are simultaneously determined ([Larcker & Rusticus, 2012](#)).<sup>11</sup> For instance, [Al-Tuwaijri et al. \(2004\)](#) argue that environmental disclosure, environmental performance, and economic performance are jointly determined (i.e., endogenous). Thus, the authors examine the relations among these corporate functions using a simultaneous equations model. They find environmental performance is positively associated with economic performance and with more extensive environmental disclosures.

Next, several quantitative CSR studies re-estimate their models using alternate samples. For instance, it is common for studies with an international sample of firms to re-run the analysis removing U.S. firms (or other specific countries), particularly if there are a large number of observations from that country, or if the political, social, or regulatory environmental in that country is quite different than that of the rest of the sample countries ([Dhaliwal et al., 2012](#); [Simnett et al., 2009](#)). Moreover, in an attempt to better align calendar year-end carbon emissions and market data with fiscal year-end accounting data, [Matsumara et al. \(2014\)](#) re-estimate their model of market value on carbon emissions using only firms with December fiscal year-ends.

<sup>6</sup> A propensity score is the predicted conditional probability, or likelihood, of being assigned to a particular treatment. The researcher may calculate this, or use a programming command, such as *psmatch2* in Stata, to generate propensity scores. See [Rosenbaum and Rubin \(1983\)](#) for further technical details.

<sup>7</sup> For our purposes, we do not discuss the additional options related to propensity score matching. For example, the researcher could match with or without replacement or alter the maximum acceptable distance (i.e., the caliper) between the propensity scores of two matched observations. See [Dehejia and Wahba \(2002\)](#) for additional detail.

<sup>8</sup> For further technical details, see [Heckman \(1997\)](#) or [Lennox et al. \(2012\)](#).

<sup>9</sup> Such exogenous variables are called "instruments" and are assumed to be either pre-determined or unrelated to the dependent variable of interest ([Larcker & Rusticus, 2012](#)).

<sup>10</sup> For further technical details on these models, see [Larcker and Rusticus \(2012\)](#).

<sup>11</sup> The correlated omitted variable bias occurs when a variable that affects both the dependent and independent variables is not included in the regression model ([Wooldridge, 2012](#)).

One final tool worth mentioning is expressing the relative or economic importance of a study's results. For example, to adjust for the fact that some independent variables of interest have much larger standard deviations than others (i.e., a one unit increase can vary substantially), the researcher can generate standardized regression coefficients by multiplying the coefficient estimate by the standard deviation of the variable, resulting in a value  $X$ . The interpretation of (a positive)  $X$  is that a one standard deviation increase in the independent variable causes an increase of  $X$  in the dependent variable. This method provides a more consistent metric to assess the relative size of an effect. Moreover, to provide a better understanding of the economic importance of their results, Hoi et al. (2013) report that irresponsible CSR firms have cash effective tax rates that are 3% lower than other firms, implying a tax savings of around \$14 million.

Overall, we believe that quantitative SEA researchers should use appropriate, relevant, and current statistical techniques within their analyses. In this spirit, non-mainstream quantitative SEA researchers can deliver the most convincing case for the results of their CSR study, irrespective of whether the study is challenging the mainstream on their own terms, testing alternative theoretical models, or testing political economy models.

## 5. Conclusions

As we stated in our introduction, large-sample, quantitative SEA research that challenges elite mainstream conceptions of corporate social responsibility (CSR) is often stuck between the proverbial rock (i.e., elite mainstream accounting research) and hard place (i.e., critical accounting research). This is true because quantitative SEA researchers whose theoretical approach or empirical results seriously erode the business case for CSR most likely find an impenetrable wall of editorial and/or anonymous reviewer "stone" between the paper and publication. Furthermore, mainstream quantitative research is quick to adopt new econometric techniques that can sometimes result in method being more important in the review process than the research question itself. The "hard place" metaphor applies to critical accounting research because positivist assumptions that support the theoretical and methodological foundation for large-sample, quantitative research are seldom commensurate with the fundamental assumptions that support critical studies (Burrell & Morgan, 1979). Quantitative, non-mainstream SEA research sometimes operates in the "middle of the road", risking being "run over" from the right or the left.

*Critical Perspectives on Accounting*, however, has been welcoming to a broad range of non-mainstream accounting research perspectives, thus supporting an interdisciplinary approach to the study of accounting and the accounting profession. This observation holds especially true for SEA research. The journal's editors have made room for SEA papers situated across a broad spectrum of research approaches. CPA articles have been published that provide some support for current SEA reporting practices (e.g., Mahoney, Thorne, Cecil, & LaGore, 2013), advocate specific SEA-related reforms (e.g., Freedman & Stagliano, 2008), envision substantive social and environmental reforms of business and society (e.g., Brown, 2009), and critique neoliberal sustainability discourses (e.g., Andrew & Cortese, 2013). This broad spectrum of theoretical perspectives provides a healthy challenge for all SEA researchers as we seek to better articulate our own thinking and our potential contribution to the critical SEA literature.

We believe that quantitative, non-mainstream SEA research plays an essential role in challenging mainstream conceptions of CSR and in forwarding serious debate over how society can better deal with issues of planetary sustainability and social justice. While there are valid arguments for opposing non-mainstream SEA research because it implicitly supports the status quo, it is also evident to us that reforms may lead to meaningful changes in society's approaches to critical social and environmental issues. Environmental reforms for example, may advance a progressive agenda that reduces the human ecological footprint (Dietz, Rosa, & York, 2007).

As discussed in our paper, we describe three options available to quantitative, non-mainstream SEA researchers as they sort through their own research program decisions. They are:

- (1) Act theoretically agnostic and challenge U.S. elite mainstream results within the boundaries of their own research traditions and language (be real thorns in their side).
- (2) Develop and/or import theories from alternative literatures that have some elements in common with the broader mainstream (attempt to initiate substantive, relevant debate within an acceptable level of shared understanding without explicitly renouncing the status quo).
- (3) Advance critical SEA research using objectivist methodologies (broaden the purview of political economy perspectives).

These options are not new and can be evidenced through the individual research agendas of many non-mainstream quantitative SEA researchers. Regardless of the option chosen, it is vital, however, to reflect on the political intentions and consequences of SEA research as it relates to potential improvements in planetary sustainability and social justice. Non-mainstream SEA researchers should continue to forge their own scholarly path in support of these goals. Thus, we advocate continued support for diversity in SEA research within the critical accounting research community.

## Acknowledgments

We would like to thank Dean Neu, Den Patten, Alan Richardson, Markus Milne, and especially Rob Gray, for their engagement in this discussion and for their insightful comments.

## References

- Al-Tuwaijri, S. A., Christensen, T. E., & Hughes, K. E. (2004). The relations among environmental disclosures, environmental performance, and economic performance: A simultaneous equations approach. *Accounting, Organizations and Society*, 29(5–6), 447–471.
- Andrew, J., & Cortese, C. (2013). Free market environmentalism and the neoliberal project: The case of the climate disclosure standards board. *Critical Perspectives on Accounting*, 24(6), 397–409.
- Archel, P., Husillos, J., & Spence, C. (2011). The institutionalisation of unaccountability: Loading the dice of corporate social responsibility discourse. *Accounting, Organizations and Society*, 36(6), 327–343.
- Arnold, P. J. (2009). Global financial crisis: The challenge to accounting research. *Accounting, Organizations and Society*, 34(6), 803–809.
- Blacconiere, W. G., & Patten, D. M. (1994). Environmental disclosures, regulatory costs, and changes in firm value. *Journal of Accounting and Economics*, 18(3), 357–377.
- Bonner, S. E., Hesford, J. W., Van der Stede, W. A., & Young, S. M. (2012). The social structure of communication in major accounting research journals. *Contemporary Accounting Research*, 29(3), 869–909.
- Brown, J. (2009). Democracy sustainability and dialogic accounting technologies: Taking pluralism seriously. *Critical Perspectives on Accounting*, 20(3), 313–342.
- Burrell, G., & Morgan, G. (1979). *Sociological paradigms and organizational analysis*. Portsmouth, NH: Heinemann.
- Bryman, A. (1984). The debate about quantitative and qualitative research: A question of method or epistemology? *British Journal of Sociology*, 35(1), 75–92.
- Cho, C. H., Chen, J. C., & Roberts, R. W. (2008). The politics of environmental disclosure regulation in the chemical and petroleum industries: Evidence from the Emergency Planning and Community Right-to-Know Act of 1986. *Critical Perspectives on Accounting*, 19(4), 450–465.
- Cho, C. H., Guidry, R. P., Hageman, A. M., & Patten, D. M. (2012). Do actions speak louder than words? An empirical investigation of corporate environmental reputation. *Accounting, Organizations and Society*, 37(1), 14–25.
- Cho, C. H., & Patten, D. M. (2007). The role of environmental disclosures as tools of legitimacy: A research note. *Accounting, Organizations and Society*, 32(7–8), 639–647.
- Clarkson, P. M., Li, Y., Richardson, G. D., & Vasvari, F. P. (2011). Does it really pay to be green? Determinants and consequences of proactive environmental strategies. *Journal of Accounting and Public Policy*, 30(2), 122–144.
- Cooper, W. W., & Zeff, S. A. (1992). Kinney's design for accounting research. *Critical Perspectives on Accounting*, 3(1), 87–92.
- Dehejia, R. H., & Wahba, S. (2002). Propensity score-matching methods for nonexperimental causal studies. *Review of Economics and Statistics*, 84(1), 151–161.
- Dhaliwal, D. S., Li, O. Z., Tsang, A., & Yang, Y. G. (2011). Voluntary nonfinancial disclosure and the cost of equity capital: The initiation of corporate social responsibility reporting. *Accounting Review*, 86(1), 59–100.
- Dhaliwal, D. S., Radhakrishnan, S., Tsang, A., & Yang, Y. G. (2012). Nonfinancial disclosure and analyst forecast accuracy: International evidence on corporate social responsibility disclosure. *Accounting Review*, 87(3), 723–759.
- Dietz, T., Rosa, E. A., & York, R. (2007). Driving the human ecological footprint. *Frontiers in Ecology and the Environment*, 5(1), 13–18.
- Dwyer, P. D., & Roberts, R. W. (2004). The contemporary gender agenda of the US public accounting profession: Embracing feminism or maintaining empire? *Critical Perspectives on Accounting*, 15(1), 159–177.
- Elliott, W. B., Jackson, K. E., Peecher, M. E., & White, B. J. (2014). The unintended effect of corporate social responsibility performance on investors' estimates of fundamental value. *Accounting Review*, 89(1), 275–302.
- Fama, E. F. (1970). Efficient capital markets: A review of theory and empirical work. *Journal of Finance*, 25(2), 383–417.
- Freedman, M., & Stagliano, A. J. (2008). Environmental disclosures: Electric utilities and Phase 2 of the Clean Air Act. *Critical Perspectives on Accounting*, 19(4), 466–486.
- Gao, F., Liscic, L. L., & Zhang, I. X. (2014). Commitment to social good and insider trading. *Journal of Accounting and Economics*, 57(2–3), 149–175.
- Godfrey, P. C., Merrill, C. B., & Hansen, J. M. (2009). The relationship between corporate social responsibility and shareholder value: An empirical test of the risk management hypothesis. *Strategic Management Journal*, 30(4), 425–445.
- Gould, K. A., Pellow, D. N., & Schnaiberg, A. (2004). Interrogating the treadmill of production: Everything you wanted to know about the treadmill but were afraid to ask. *Organization & Environment*, 17(3), 296–316.
- Gray, R. H. (2002). The social accounting project and *Accounting Organizations and Society* privileging engagement, imaginings, new accountings and pragmatism over critique? *Accounting, Organizations and Society*, 27(7), 687–708.
- Gray, R. H. (2006). Social, environmental, and sustainability reporting and organisational value creation? Whose value? Whose creation?. *Accounting, Auditing and Accountability Journal*, 19(3), 319–348.
- Gray, R. H., Kouhy, R., & Lavers, S. (1995). Corporate social and environmental reporting: A review of the literature and a longitudinal study of UK disclosure. *Accounting, Auditing and Accountability Journal*, 8(2), 47–77.
- Gray, R. H., & Milne, M. J. (2015). It's not what you do, it's the way you do it? Of method and madness. *Critical Perspectives on Accounting* (in press).
- Gray, R. H., Owen, D. L., & Adams, C. (2010). Some theories for social accounting? A review essay and tentative pedagogic categorisation of theorisations around social accounting. *Advances in Environmental Accounting and Management*, 4, 1–54.
- Guidry, R. P., & Patten, D. M. (2012). Voluntary disclosure theory and financial control variables: An assessment of recent environmental disclosure research. *Accounting Forum*, 36(2), 81–90.
- Heckman, J. (1997). Instrumental variables: A study of implicit behavioral assumptions used in making program evaluations. *Journal of Human Resources*, 32(3), 441–462.
- Hoi, C. K., Wu, Q., & Zang, H. (2013). Is corporate social responsibility (CSR) associated with tax avoidance? Evidence from irresponsible CSR activities. *Accounting Review*, 88(6), 2025–2059.
- Hopwood, A. G. (2007). Whither accounting research? *Accounting Review*, 82(5), 1356–1374.
- Jensen, M. C. (1978). Some anomalous evidence regarding market efficiency. *Journal of Financial Economics*, 6(2), 95–101.
- Kim, Y., Park, M. S., & Wier, B. (2012). Is earnings quality associated with corporate social responsibility? *Accounting Review*, 87(3), 761–796.
- Kothari, S. P. (2001). Capital markets research in accounting. *Journal of Accounting and Economics*, 31(1), 105–231.
- Larcker, D. F., & Rusticus, T. O. (2012). On the use of instrumental variables in accounting research. *Journal of Accounting and Economics*, 49(3), 186–205.
- Lehman, G. (2001). Reclaiming the public sphere: Problems and prospects for corporate social and environmental accounting. *Critical Perspectives on Accounting*, 12(6), 713–733.
- Lennox, C. S., Francis, J. R., & Wang, Z. (2012). Selection models in accounting research. *Accounting Review*, 87(2), 589–616.
- Lewis, M. W., & Grimes, A. I. (1999). Metatriangulation: Building theory from multiple paradigms. *Academy of Management Review*, 24(4), 672–690.
- Maddala, G. (1991). A perspective on the use of limited-dependent and qualitative variables models in accounting research. *Accounting Review*, 66(4), 788–807.
- Mahoney, L. S., Thorne, L., Cecil, L., & LaGore, W. (2013). A research note on standalone corporate social responsibility reports: Signaling or greenwashing? *Critical Perspectives on Accounting*, 24(4), 350–359.
- Malkiel, B. G. (2003). The efficient market hypothesis and its critics. *Journal of Economic Perspectives*, 17(1), 59–82.
- Matsumura, E. M., Prakash, R., & Vera-Munoz, S. C. (2014). Firm-value effects of carbon emissions and carbon disclosures. *Accounting Review*, 89(2), 695–724.
- Merchant, K. A. (2008). Why interdisciplinary accounting research tends not to impact most North American academic accountants. *Critical Perspectives on Accounting*, 19(6), 901–908.
- Moser, D. V., & Martin, P. R. (2012). A broader perspective on corporate social responsibility research in accounting. *Accounting Review*, 87(3), 797–806.
- Neu, D., Warsame, H., & Pedwell, K. (1998). Managing public impressions: Environmental disclosures in annual reports. *Accounting, Organizations and Society*, 23(3), 265–282.
- Owen, D. (2008). Chronicles of wasted time? A personal reflection on the current state of, and future prospects for, social and environmental accounting research. *Accounting, Auditing and Accountability Journal*, 21(2), 240–267.

- 466 Patten, D. M. (2015). An insider's reflection on quantitative research in the social and environmental disclosure domain. *Critical Perspectives on Accounting* (in  
467 press).
- 468 Ramchander, S., Schwebach, R. G., & Staking, K. (2012). The informational relevance of corporate social responsibility: Evidence from DS400 index reconstitutions.  
469 *Strategic Management Journal*, 33(3), 303-314.
- 470 Richardson, A. J. (2015). Quantitative research and the critical accounting project. *Critical Perspectives on Accounting* (in press).
- 471 Roberts, R. W. (1992). Determinants of corporate social responsibility disclosure: An application of stakeholder theory. *Accounting, Organizations and Society*,  
472 17(6), 595-612.
- 473 Roberts, R. W., & Bobek, D. D. (2004). The politics of tax accounting in the United States: Evidence from the Taxpayer Relief Act of 1997. *Accounting, Organizations  
474 and Society*, 29(5), 565-590.
- 475 Robey, D. (1996). Research commentary: Diversity in information systems research: Threat, promise, and responsibility. *Information Systems Research*, 7(4), 400-  
476 408.
- 477 Rosenbaum, P. R., & Rubin, D. B. (1983). The central role of the propensity score in observational studies for causal effects. *Biometrika*, 70(1), 41-55.
- 478 Rubin, D. B. (1973). Matching to remove bias in observational studies. *Biometrics*, 29(1), 159-183.
- 479 Schnaiberg, A. (1980). *Environment: From surplus to scarcity*. Oxford, UK: Oxford University Press.
- 480 Schwartz, B. N., Williams, S., & Williams, P. F. (2005). US doctoral students' familiarity with accounting journals: Insights into the structure of the US academy.  
481 *Critical Perspectives on Accounting*, 16(3), 327-348.
- 482 Simnett, R., Vanstraelen, A., & Chua, W. F. (2009). Assurance on sustainability reports: An international comparison. *Accounting Review*, 84(3), 937-967.
- 483 Spence, C. (2009). Social accounting's emancipatory potential: A Gramscian critique. *Critical Perspectives on Accounting*, 20(2), 205-227.
- 484 Spence, C., Husillos, J., & Correa-Ruiz, C. (2010). Cargo cult science and the death of politics: A critical review of social and environmental accounting research.  
485 *Critical Perspectives on Accounting*, 21(1), 76-89.
- 486 Tinker, T., & Gray, R. (2003). Beyond a critique of pure reason: From policy to politics to praxis in environmental and social research. *Accounting, Auditing and  
487 Accountability Journal*, 16(5), 727-761.
- 488 Tinker, T., Lehman, C., & Neimark, M. (1991). Falling down the hole in the middle of the road: Political quietism in corporate social reporting. *Accounting, Auditing  
489 and Accountability Journal*, 4(2), 28-54.
- 490 Tinker, A. M., Merino, B. D., & Neimark, M. D. (1982). The normative origins of positive theories: Ideology and accounting thought. *Accounting, Organizations and  
491 Society*, 7(2), 167-200.
- 492 Woolridge, J. (2012). *Introductory econometrics: A modern approach* (5th ed.). Independence, KY: Cengage Learning.
- 493 York, R., & Clark, B. (2006). Marxism, positivism, and scientific sociology: Social gravity and historicity. *Sociological Quarterly*, 47(3), 425-450.
- 494 York, R., & Rosa, E. A. (2003). Key challenges to ecological modernization theory institutional efficacy, case study evidence, units of analysis, and the pace of eco-  
495 efficiency. *Organization & Environment*, 16(3), 273-288.
- 496 York, R., Rosa, E. A., & Dietz, T. (2003). Footprints on the Earth: The environmental consequences of modernity. *American Sociological Review*, 68(2), 279-300.