

THE CONCEPT OF OPPORTUNITY COST: IS IT SIMPLE, FUNDAMENTAL OR NECESSARY?*

Rod O'Donnell
School of Finance and Economics
University of Technology, Sydney

ABSTRACT

Surveys by Ferraro and Taylor (2005) point to abysmal understandings of the concept of opportunity cost by US faculty, graduates and undergraduates. Given that opportunity cost is widely believed to be fundamental to economic thinking, this empirical evidence raises important teaching and conceptual issues. One implication is that the concept is poorly taught in textbooks and classrooms from which it follows that pedagogical remedies are needed. Three further implications, however, strongly influence the extent and nature of such remedies. These implications are that opportunity cost is not a simple concept but a difficult one, that it is not a fundamental economic concept but either a subordinate or optional one, and that graduates do not actually require a good understanding of the concept for successful careers as economists. This paper presents argument to support these propositions, and discusses their bearing on approaches to the teaching of opportunity cost.

Keywords: Opportunity Cost, Economic Analysis, Graduate Skills.

JEL classifications: A10, A20, D01

* Correspondence: Rod O'Donnell, School of Finance and Economics, University of Technology, Sydney, P.O. Box 123, Broadway, NSW, 2007, Australia; Email: rod.odonnell@uts.edu.au. This is a revised and expanded version of a paper presented to the 2008 Australian Teaching Economics Conference at the University of Western Sydney. I thank Joseph Macri, Bruce Littleboy, Tony Aspromourgos, Craig Freedman, Ross Guest and two anonymous referees for helpful comments.

1. INTRODUCTION

Recent surveys by Ferraro and Taylor (2005) provide valuable empirical information on how well US faculty, graduates and undergraduates understand the concept of opportunity cost. A key motivation for their study was the view that graduate programs give significantly less attention to economic reasoning skills as compared to mathematical mastery or empirical knowledge.¹ While the authors chose largely diplomatic language in presenting their results, their findings are actually quite alarming and explosive in their implications. The data not only generate important questions about the teaching of economics, but also about the difficulty, nature and importance of the concept of opportunity cost itself. Although the authors discuss the first implication, they do not explore the last three. But since these latter issues are strong determinants of the courses of action that could be taken to remedy the pedagogical problem, they deserve closer attention.

Based on the belief that the issues raised are deep and fundamental, this paper explores the wider implications of the empirical findings. Four implications are discussed:

1. The concept of opportunity cost is *not* generally well exposed in textbooks or classrooms. Ferraro and Taylor discuss this proposition but do not explicitly extend their analysis to possible remedies.
2. The concept is not simple and straightforward, but actually quite *complex*.
3. The concept is not a fundamental concept in contemporary orthodox economics, but either a *subsidiary* or *optional* one.
4. A good understanding of the concept is *not* necessary for a successful career as an economist.

¹ See Ferraro and Taylor (2005, p.1) which cites, *inter alia*, Colander and Klamer (1987) and Colander (2005). The former found that graduate programs strongly emphasised mathematical mastery over (a) knowledge of the economy and (b) knowledge of the economic literature, while the updated later study found that graduate programs still appeared 'highly technical, theoretical and unconcerned with reality', and concluded, *inter alia*, that core courses should focus more on 'economic reasoning and not technique' (Colander 2005, pp.181, 198).

All the implications are supported by logical argument, regardless of the degree to which they are controversial. They are also relevant to clarifying the full choice set of remedies.

2. THE FOUR SURVEYS

Ferraro and Taylor conducted four surveys, each of which raised worrying issues.

1. The most important survey was of economics PhD holders (including faculty) and PhD students attending the 2005 Allied Social Sciences Association (ASSA) meeting in Philadelphia. The sample of 192 had the following characteristics – about 67% had a PhD and 33% were enrolled in PhD programs, approximately 45% were from ‘top-30 economics departments’ in the US, and about 61% had taught introductory economics at tertiary level. Clearly, this was not a trivial group – they represented some of ‘the most well-trained economists on the planet’ (Ferraro and Taylor 2005, p.7), and they possessed considerable teaching experience. Understanding of the concept was tested by means of a single multiple choice question as follows:

You won a free ticket to see an Eric Clapton concert (which has no resale value). Bob Dylan is performing on the same night and is your next-best alternative activity. Tickets to see Dylan cost \$40. On any given day, you would be willing to pay up to \$50 to see Dylan. Assume there are no other costs of seeing either performer. Based on this information, what is the opportunity cost of seeing Eric Clapton?

- A. \$0 B. \$10 C. \$40 D. \$50.

The question was adapted from Frank and Bernanke (2001), a well-regarded US introductory microeconomics text. As the content of such texts has not changed much over time or across authors, it is likely that all respondents would have been trained using similar materials and exercises.

Expressed as percentages of respondents, the results of this survey were as follows:

- A. (\$0): 25.1% B. (\$10): 21.6% C. (\$40): 25.6% D. (\$50): 27.6%.

The authors found the results surprising but, given views on the centrality of the concept, a more appropriate adjective would be astonishing. Not only was the correct answer (\$10) chosen by the *least* number of respondents but, more importantly, the responses were spread quite evenly across all the alternatives. As Ferraro and

Taylor (2005, p.3) put it: 'In essence, the answers given to us by well-trained economists appear to be randomly distributed across possible answers'. Less politely, one could say that the same results could be expected, on average, from lay people with no training in economics, from monkeys pressing levers, or from machines capable of random selection processes. Reinforcing this conclusion was the further finding that, among respondents who had previously taught economics principles courses, only 22.5% answered correctly.²

2. The second survey was a smaller test run. The same question was given to 24 faculty colleagues at different institutions, of whom only 21% answered correctly. Again, this is an alarming result for a group of academics highly trained in economics. Of the 79% who answered incorrectly, none reported that they used random guessing, from which the authors inferred that these respondents had all applied a flawed understanding of the concept in answering the question.

3. The third survey was partly motivated by concerns about wording and partly by a colleague's (odd) remark about the unimportance of definitions. The question was re-phrased *without* the words 'opportunity cost', the intention being to test whether or not economists could 'identify the relevant trade-offs that guide decision-making' in Neoclassical economics. The new question was the same as the original except that the last sentence in the stem became: 'Based on this information, what is the minimum amount (in dollars) you would have to value seeing Eric Clapton for you to choose his concert?' The sample was again small, consisting of 34 academic economists of whom 44% answered correctly. While a significant improvement on the earlier 21.6%, it still represents a minority of the respondents. It also suggests that the re-worded question was easier to answer than the question containing the words 'opportunity cost', which lends further weight to the conclusion that graduates do not have a good grasp of this concept.

4. The fourth survey gave the original question to 358 undergraduate students during the first week of an introductory microeconomics course *before* the concept of opportunity cost had been introduced. Of the 76% of the class who had previously taken an economics course, only 7.4% answered correctly, while of the

² Less formal surveys by the author presenting the same question to different audiences (graduate students, and faculty attending economics conferences) produced similar results.

remaining 24% of respondents, 17.2% answered correctly. This unhappy difference was found to be statistically significant. More importantly, no statistically significant difference was found between the percentage of *graduate* students who answered correctly in the first survey (21.6%) and the percentage of undergraduates *without* prior exposure to economics who answered correctly in this survey (17.2%).

This finding suggests that further study is necessary to correct the damage done to economic intuition by previous introductory economics courses. Even so, the rectification generated by at least 3 years further study of economics is only sufficient to bring the likelihood of answering the question correctly up to the level of people who have never studied economics before. This means that 3 to 7 years devoted to studying economics has no overall influence whatsoever on the ability to answer correctly a question about an idea that many claim to be one of the most fundamental concepts in the subject. If so, the opportunity cost of studying economics is enormous.

3. THE AUTHORS' COMMENTS ON THE DISMAL PERFORMANCE³

The failure of nearly 80% of the respondents in the first survey to provide the correct answer has important implications for the teaching of economics. This led Ferraro and Taylor to examine nine top-selling tertiary introductory texts with two issues in mind – the definition of opportunity cost, and the accompanying discussion used to deepen understanding of the concept. They found that while the definitions presented in all nine texts were ‘correct’, they were nevertheless ‘terse’ and reliant on examples to explain the concept and its associated terms. In addition, most of these examples were very simple and lacked sufficient detail to indicate that both benefits and costs were involved. Seven of the nine texts, moreover, did not provide the reader with sufficient information to answer the ‘straightforward’ question in the survey. Based on this sample of textbooks, they concluded that the dismal performance of

³ All quotations in the next two sections are from Ferraro and Taylor (2005, pp.9-11).

undergraduates with previous exposure to economics was not surprising.⁴

In relation to economic research, while the implications were seen as important to a lesser extent, they were also viewed as problematic. Their discussion was based on the narrowly focused question: 'Does it matter for economic research if economists cannot identify the opportunity cost in a simple contrived question?' To this question, the authors were unable to give a clear answer. As regards academic research, they argued that 'it apparently does not matter' – because theoretical research 'rarely requires that an individual calculate an opportunity cost in terms of a word problem', and empirical research concentrates more on 'techniques to make inferences about parameter values in models'. On the other hand, for economists employed in the private or public sectors, they argued it obviously does matter. In this context, 'opportunity costs are the fodder of daily decisions' and are 'the only input that economists are likely to have'. The implication is that such graduates should definitely be able to answer 'simple, albeit contrived, opportunity cost questions'.

The authors' discussion may be summed up as follows. First, undergraduate teaching is failing to deliver good understandings of opportunity cost. Second, graduate education is likewise deficient because it does not revisit the concept and reinforce its relevance to real world decision-making. And finally, these deficiencies create doubts about the value of an economics degree. The fact that economics programs cannot instil a deep and intuitive understanding of a fundamental idea whose frequent application could do much private and public good raises serious questions about the value-added by these programs to college curricula.

4. COMMENTS ON THE AUTHORS' DISCUSSION

The first comment is that there is a tension between, on the one hand, accepting that the concept is straightforward and that textbook definitions are correct, and, on the other, criticising the teaching of undergraduate and postgraduate economics for not providing adequate

⁴ At the graduate level, this conclusion can be reached using the three surveys of graduate students by Colander and Klamer (1987), Colander (2003) and Colander (2005), all of which indicate the central role of graduate education in the reproduction of academic economists. Given the general absence of opportunity cost from graduate programs, it is not surprising that faculty and PhD students also demonstrate poor understandings.

understandings (and even for apparently damaging students' understandings as in the fourth survey). If the concept really is simple or straightforward, then teachers should have no difficulty in providing sound intuitive understandings from the outset. To resolve this tension, something has to give – abandoning the notion that opportunity cost is a simple or straightforward concept seems the right move to make.

A second (related) tension is between saying that all the examined definitions were correct, and then criticising them or their amplifying discussions for being either imprecise (not specifying the meaning of all relevant terms) or incomplete (not providing enough information to grasp the concept fully). An imprecise or incomplete definition (or discussion) is certainly not a good definition (or discussion), and certainly not a fully correct one either. At best, an imprecise or incomplete definition can only be *partially* correct, or correct as far as it goes which may not be that far. A good definition will be carefully crafted so that its wording is precise, accurate, comprehensive and concise. On a first reading, its full import may not be comprehended but, after absorbing accompanying explanations and examples and doing set questions, its meaning should become sufficiently clear for it always to deliver accurate answers in both simple and complex situations. This is clearly an area where textbooks can be significantly improved. Many standard introductory texts provide rather loose definitions of opportunity cost, and subsequent texts do not provide correctives at higher levels of the curriculum. If true, the authors' claim (2005, p.9) that principles of economics textbooks 'are likely to be the only economics reference book that most individuals will ever read' is a sad comment on the state of modern economics education.

Third, there is some unevenness in the treatment of academic research economists on the one side and professional economists and students on the other. It is viewed as critical for professional economists and students to be able to answer such questions correctly, but for academic research economists it apparently does not matter. This lets these highly trained economists off too lightly, and could create an impression of not wanting to offend this group. If the concept is truly straightforward and fundamental to the discipline, then economists in *all* fields should be able to answer a straightforward question without difficulty.

Fourth, it is misleading to characterise the issue merely as 'a word problem' with little relevance to theoretical research. It is actually a *conceptual* problem, and conceptual problems are central to research activity.

Finally, in relation to the incorrect answers, the authors provide rationales for why respondents chose \$40 or \$50 but there is less discussion of why some chose \$0. In fact, there is an understandable rationale here, for if these respondents were merely recalling the loose idea that opportunity cost is what you have to give up to get what you want, then they might have reasoned that since the Clapton ticket is free, nothing has to be given up to get the more valued alternative.

Two further remarks bear on the way in which the authors' findings are deployed in the following discussion. First, any empirical study can always be criticised on data collection and processing grounds. The criticisms might include the framing of the question, the gathering of responses, or the choice of the correct answer, and some of these criticisms may well have merit.⁵ These issues will not be pursued, however. Instead, I shall assume that Ferraro and Taylor have presented *credible empirical evidence*. In its strong form, this amounts to accepting their results as robust while, in its weak form, it amounts to saying that whatever imperfections their methods and results might possess, the general tenor or direction of their findings is correct. Note, however, that provided other aspects of their procedure are accepted, it matters little in what follows whether their chosen answer is correct or not. Since the distribution of responses in the main survey is effectively flat, a different right answer will have little impact on the arguments.⁶

Second, it is recognised that there are doubtless variations across graduate economists from better to worse understandings of the concept, and that there can be simpler opportunity cost questions where economics graduates might do far better than lay people. However the primary survey focused on the upper levels of the profession – PhD graduates and students, many from 'top' departments, and many with considerable experience in teaching principles. If the 'cream' perform dismally in answering a reasonably

⁵ To the extent that they do, they may reinforce the claim that opportunity cost is a difficult notion.

⁶ The distribution of responses for the other surveys was not given in their paper.

straightforward question, there is little hope that those they instruct will have better understandings.

5. IS OPPORTUNITY COST A SIMPLE CONCEPT?

Almost all textbooks, economics faculty and other economists share the view that opportunity cost is a simple, straightforward concept. In textbooks, this is evident from the small amount of space (usually one or two pages) devoted to defining and elucidating the idea, from the simplicity of the accompanying examples and their (apparently) straightforward answers, and from its rare re-visitation at higher levels of the subject. In addition, the general absence of discussion of the concept in the academic literature supports the notion of a settled Neoclassical consensus.⁷

Yet the survey results point dramatically to the opposite conclusion – namely, that opportunity cost is a difficult concept to understand fully, that its application can sometimes be difficult, and that it does not remain readily in the memory. If it were so simple, why would a sample of the best-trained economists in the world perform so dismally when faced with a straightforward question? Two main alternatives present themselves:

1. The concept really is simple, but highly intelligent and well-trained people do not understand it properly. Bad instruction at all levels of the curriculum (including the substitution of technique for conceptual understanding) creates a fog through which intelligent people cannot see, even after years of study and teaching.
2. The concept is not simple but difficult. The bad instruction lies in pretending otherwise, and avoiding the complexities, subtleties and underlying assumptions of the concept.

In my view, the second alternative is more accurate for at least three reasons. First, it is most unlikely that very intelligent people will be as utterly hopeless at applying a simple concept to straightforward situations as the surveys demonstrate. Second, the idea is an unusual one when first encountered, sufficiently different from the lay idea of cost that it does not appeal directly to the intuition and is not easily

⁷ There are exceptions such as those exploring troublesome threshold concepts in economics, and those teachers who express their concerns privately or informally rather than in print.

retained by the mind. It is only when a person's intuition becomes 'trained' and 'practiced' that the concept becomes 'simple'. And third, reflection reveals significant conceptual issues and difficulties in application (even in the simple examples of the texts) that require far greater discussion if deeper and fuller understanding is to be attained.

6. IS OPPORTUNITY COST A FUNDAMENTAL CONCEPT?

There is also widespread (and seemingly universal) agreement among Neoclassical and Austrian economists that opportunity cost is one of the most fundamental concepts of economics. Frank (2002, p.460) views opportunity cost as 'utterly central to our understanding of what it means to think like an economist', while Case and Fair (2002, p.2) contend that three of the 'most fundamental concepts' of economics are opportunity cost, marginalism, and efficient markets. Opportunity cost is also central to the voluntary content standards promulgated by the Council for Economic Education (1997) and advocated for principles courses by Hansen *et al* (2002). In similar vein, Ferraro and Taylor (2005, pp.1,11) make the claims that 'One of the most important contributions economics has to offer as a discipline is the understanding of opportunity cost and how to apply this concept to all forms of decision making', that the concept is 'arguably the most fundamental concept in economic reasoning', and that it is 'one of the most fundamental ideas that the discipline has to offer...whose frequent application could do the most good in people's private and public lives'. The implications are that one cannot grasp economic thinking without grasping opportunity cost, and that the concept has a large role to play in improving everyone's lives.

But what does it mean for a concept to be fundamental? It must mean that the concept is an essential part of the conceptual framework of a discipline, that it is a referent in all or most analyses and applications, and that it forms an enduring idea informing, guiding and framing all or most issues in the discipline at all levels. As examples, take physics where force and energy are fundamental concepts, chemistry where molecules are central, biology where cells and genes are fundamental, or Marxism where social class is a fundamental category. It is impossible to converse meaningfully in these disciplines on any major question or issue without reference to these concepts; they constantly permeate all discourse, figure in all levels of instruction, and have central roles in research.

Can the same be said of opportunity cost? Not at all. Typically, in principles textbooks it is given a relatively brief introduction in one of the opening chapters, after which it is applied to topics such as production possibility frontiers, cost curves and comparative advantage. In intermediate texts, it is only sporadically encountered, and in advanced texts it disappears altogether. In other words, as the edifice of economic theory is built up and elaborated, references to opportunity cost rapidly decline to zero. A great deal of higher level research, moreover, is conducted with little or no mention of this putatively fundamental concept. This contrasts strongly with the role of fundamental concepts in almost every other discipline, for such concepts remain crucial to discourses across textbooks, teaching, research and practice.⁸

We now face a fork in the road. Either economics is a peculiar and unique subject in which discussion in many areas can proceed independently of one of its fundamental concepts. Or the concept of opportunity cost is not a fundamental economic concept, and is thus either a subordinate or an optional one. In my view, the second alternative is more plausible, partly for the above reasons and partly because of the following argument. In Neoclassical economics, one truly fundamental concept (in the above sense) is the rational, self-interested maximising agent, the primary aim of which is to identify and select, out of all alternatives, that course of action which yields the highest net benefit or rate of return. In this context, opportunity cost does not appear to have any *necessary* role in decision-making. Performed properly, one can arrive at *exactly* the same optimal decision, either on the basis of explicit costs alone, or on the more standard procedure of combining explicit costs and implicit (or opportunity) costs. If this is correct, the inclusion of opportunity cost then becomes a matter of preference as to how one teaches orthodox choice theory – it can be presented using opportunity cost, or it can be presented without reference to this concept at all.⁹

Clearly, this is *not* to suggest that costs are unimportant in decision-making. Far from it, they are essential. But it *is* to suggest that costs

⁸ Another indication of the low profile of opportunity cost is given by the 4,000 pages of the *New Palgrave Dictionary of Economics* (Eatwell *et al* 1998). Its index only gives three page references to opportunity cost which is fewer than those given to ‘congestion’, ‘entropy’ and ‘usury’, for example.

⁹ Note that while trade-offs are central to choice and substitution, trade-offs are not identical to opportunity costs.

can be handled perfectly well in decision making without reference to *the special notion of opportunity cost*. The standard insistence upon the necessity of opportunity cost may be driven by non-technical, even ideological, reasons.

However, if the above demotion is resisted and opportunity cost declared to be fundamental, logic requires at least two responses. First, we need a definition of a fundamental concept and its distinguishing characteristics which is significantly different from that given above. Second, we need an explanation of why this definition provides a plausible, general account applicable to all disciplines (including Neoclassical economics) or, alternatively, of why Neoclassicism should be an exception from that which applies in other disciplines. Both would appear to be difficult tasks.

7. IS OPPORTUNITY COST NECESSARY FOR A SUCCESSFUL CAREER AS AN ECONOMIST?

The answer to this question has to be a resounding affirmative from a Neoclassical perspective which regards the concept as fundamental. This is because economists who do not correctly identify true costs because of flawed understandings will make mistakes in decisions, policy-making and advice. These mistakes will lead to inferior or disastrous outcomes which will lead to individuals being penalised or fired. The 'test of the market' – the normal workings of competition – and the 'efficiency principle' – the idea that arrangements that persist are efficient – will ensure that only the competent succeed.¹⁰ As Stigler (1992, p.459) put it, 'institutions and practices found wanting will not survive in a world of rational people'. And for Case and Fair (2002), 'If your study of economics is successful, you will use [opportunity cost] every day in making decisions'.¹¹

But again reality seems to declare otherwise. If highly trained academics have a poor understanding of the concept, then it is almost certain that those they train will also have poor (or even poorer) understandings. Professional economists were not separately surveyed by Ferraro and Taylor but it is reasonable to believe that they would also demonstrate a dismal performance in answering the question. However, we do not actually see large scale firings of professional economists, nor are they highly unsuccessful in their

¹⁰ On the efficiency principle, see Milgrom and Roberts (1992, pp.24-5, 598).

¹¹ Cited by Ferraro and Taylor (2005, p.11).

careers, nor are there calls from outside academia to emphasise opportunity cost in the training of graduates. It can thus be concluded that, to be useful and successful, this group does *not* need good understandings of a putatively fundamental concept belonging to the essence of the subject they are practising. Since current educational practices have not changed for a considerable period, these practices must, on Neoclassical logic, be efficient. Hence a good understanding of opportunity cost is not required. This conclusion conflicts with the previous claim that opportunity cost is fundamental to being successful, so that Neoclassicism is caught on the horns of a dilemma.

Such a situation could not possibly arise in the case of physicists or engineers. If they lacked a good grasp of force or energy, they would be quickly shown the door – spacecraft and bridges must perform well with minimal probabilities of failure. That successful careers exist for economists with poor understandings of opportunity cost is a strong case for believing that this is not a fundamental concept necessary for the successful practice of economics.

8. IS OPPORTUNITY COST AN UNDISPUTED CONCEPT?

It is worth noting that the standard Neoclassical treatment of the concept is not without its critics. Buchanan (1998, pp.719-20), writing from an Austrian perspective, emphasizes that opportunity cost is an entirely subjective notion that cannot be objectified or measured by anyone external to the chooser and thus cannot be readily translated into non-subjective dimensions such as money. This conflicts with typical textbook examples which put dollar values on the opportunity cost of going to college or of becoming a basketball player, and sits uncomfortably with including opportunity cost in dollar values of firms' costs. Buchanan further argues that the logic of setting price equal to marginal cost in non-market settings (a staple of most textbooks) is 'a tissue of confusion based on a misunderstanding of opportunity cost'.

It is noteworthy that Buchanan (and anyone else adopting Austrian subjectivism) would not be able to answer the Clapton-Dylan question because the alternatives do not include the correct answer. The correct answer would not be a dollar amount, but the subjective utility that the dollar amount represents to the individual making the choice, this being something that necessarily varies across individuals. So perhaps the question is not so straightforward after all. While

apparently straightforward in a Neoclassical framework,¹² it is inadequately specified in an Austrian framework.

9. WHERE TO FROM HERE?

There would, I think, be fairly widespread agreement that opportunity cost is currently not well taught and understood, and that this state of affairs has persisted for at least several decades. The key question is what should be done about it. As always, rational decisions are assisted by consideration of the full choice set. In this context, three main alternatives appear available. Opportunity cost is either (i) necessary and fundamental, or (ii) necessary but subsidiary, or (iii) optional and dispensable.

For those who view it as necessary and fundamental, the situation is extremely serious and needs to be addressed urgently by significant changes in teaching practices. Exactly what changes are appropriate is a matter for discussion. Frank (2005) would presumably renovate the curriculum by moving away from the common structure of encyclopaedic introductory courses followed by advanced formalised courses, for he sees this type of training as the main reason why both students and professors finish up with only tenuous grasps of the concept. But whatever one's diagnosis, one should not automatically jump to the conclusion that merely expanding the time and examples given to opportunity cost in *introductory* courses will be sufficient. Writers who see opportunity cost as a 'threshold concept', such as Davies and Mangan (2007, p.724), have argued that this, on its own, may actually hinder a full understanding of the concept because it fails to develop its alleged integrative properties across the full curriculum.

However, for those who do not regard the concept as necessary and fundamental, or who are at least undecided on the issue, other remedies can be considered. Here the key question is the extent to which Neoclassical theory can be taught without reference to opportunity cost. Is it possible merely to reduce its role, or is it possible to eliminate it entirely? If one views the concept as necessary but subsidiary, then improved exposition and teaching are desirable but not as urgent. But if Neoclassical decision theory can be recast without deploying opportunity cost at all, then the concept becomes optional rather than necessary, which means that a troublesome concept can be avoided by both learners and teachers. Given that this

¹² Frank (2005) declares that 'the unambiguously correct answer to the question is \$10'.

might be true and that large potential payoffs are involved, the proposition should not be dismissed out of hand but subjected to closer scrutiny.¹³

10. CONCLUSION

Ferraro and Taylor have performed valuable service in raising the issue of how well opportunity cost is understood by faculty, graduates and economics students, and in generating unique empirical information about the depth of these understandings. If the concept really is simple, fundamental and necessary, the findings are depressing and reflect poorly on the competencies imparted to graduates in the area of economic reasoning and intuition. From this perspective, there is much to be done in the teaching arena to address the problem, but, given the slowness of textbooks and institutions to change, it is doubtful that major progress will be seen in the short term.¹⁴ If opportunity cost *is* one of the economist's most important gifts to the world, capable of doing much good in people's private and public lives, then the opportunity cost of inaction is massive.

However, an alternative perspective has been advanced that casts the concept in a different light. It has been suggested that opportunity cost is a difficult concept and not a simple one, that it is not a fundamental concept but either a subsidiary or optional one, and that a deep understanding of the concept is not necessary for a successful career in economics. Should these propositions be resisted, reason calls for argued rebuttal rather than assertive or dismissive responses. We need to be shown why the concept is actually simple despite the dismal performance of graduates, why it is truly fundamental even though its treatment and use is so vastly different from fundamental concepts in other disciplines, and why those with such a poor understanding of the concept can nevertheless have successful careers when careers in other disciplines would collapse in the absence of a sufficient understanding of fundamental concepts.

The alternative perspective adds two further options to the choice set, both of which alter the task facing textbook writers and lecturers. The milder one is that opportunity cost is a necessary but subsidiary concept, in which case improvements in teaching are still needed but are less critical. The more radical one is that opportunity cost is an

¹³ This topic will be analysed in detail in a later paper.

¹⁴ On the slowness of textbooks to change significantly, see Colander (2004).

optional and dispensable concept within Neoclassical pedagogy; that is to say, one can teach the subject with or without this concept depending on one's preferences, there being no unique approach to this issue in relation to optimal decision making. If the latter view can be sustained, the short term costs of revisions to the curriculum would be amply repaid by the large benefits to learners and teachers in the short, medium and long terms. However, before any revision of textbooks and teaching practices occurs, the most appropriate course of action is clarification of the actual status of the concept of opportunity cost.

REFERENCES

- Buchanan, J.M. (1998) 'Opportunity Cost', in Eatwell, J., Milgate, M. and Newman, P. (eds.) *The New Palgrave, A Dictionary of Economics*, London: Macmillan, pp.718-21.
- Case, K.E. and Fair, R.C. (2002) *Principles of Economics*, New Jersey: Prentice Hall.
- Colander, D. (2003) 'The Aging of an Economist', *Journal of the History of Economic Thought*, 25(2), pp.157-76.
- Colander, D. (2004) 'Caveat Lector: Living with the 15% Rule', *Australasian Journal of Economics Education*, 1(1), pp.30-40.
- Colander, D. (2005) 'The Making of an Economist Redux', *Journal of Economic Perspectives*, 19(1), pp.175-98.
- Colander, D. and Klammer, A. (1987) 'The Making of an Economist', *Journal of Economic Perspectives*, 1(2), pp.95-111.
- Council for Economic Education (1997) *Voluntary National Content Standards in Economics*. Available at <http://www.ncee.net/ea/standards/standards.pdf>
- Davies, P. and Mangan, J. (2007) 'Threshold Concepts and the Integration of Understanding in Economics', *Studies in Higher Education*, 32 (6), pp.711-26.
- Eatwell, J., Milgate, M. and Newman, P. (1998) (eds.) *The New Palgrave, A Dictionary of Economics*, London: Macmillan.
- Ferraro, P.J. and Taylor, L.O. (2005) 'Do Economists Recognize an Opportunity Cost When They See One? A Dismal Performance from the Dismal Science', *Contributions to Economic Analysis and Policy*, 4(1), Article 7.
- Frank, R.H. (2002) 'The Economic Naturalist: Teaching Introductory

- Students How to Speak Economics', *American Economic Review Papers and Proceedings*, 92 (2), pp.459-62.
- Frank, R.H. (2005) 'The Opportunity Cost of Economics Education', *New York Times*, September 1.
- Frank, R.H. and Bernanke, B.S. (2001) *Principles of Economics*, New York: McGraw Hill/Irwin.
- Hansen, W.L., Salemi, M.K. and Siegfried, J.J. (2002) 'Use it or Lose it: Teaching Literacy in the Economics Principles Course', *American Economic Review Papers and Proceedings*, 92 (2), pp.463-72.
- Milgrom, P. and Roberts, J. (1992) *Economics, Organization and Management*, New Jersey: Prentice Hall.
- Stigler, G. (1992) 'Law or Economics?', *Journal of Law and Economics*, 35 (2), pp.455-68.