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AUSTRALASIAN JOURNAL OF ECONOMICS EDUCATION

MISSION STATEMENT

The Australasian Journal of Economics Education is a peer-reviewed journal that publishes papers on all aspects of economics education. With a view to fostering scholarship in the teaching and learning of economics, it provides a forum for publishing high quality papers and seeks to bring the results to a widening audience. Given both the increasing diversity of the student clientele, and increasing calls for greater attention to the quality of tertiary teaching, this Journal seeks to foster debate on such issues as teaching techniques, innovations in the teaching of economics, student responses to such teaching, and the incentive systems which influence the academic teaching environment. The AJEE is interested in research involving both quantitative and qualitative analyses and also in interpretative analyses based on case studies. While the Journal is Australasian-focussed, it encourages contributions from other countries in order to promote an international perspective on the issues that confront the economics discipline. AJEE aspires to:

1. Report research on the teaching of economics, and cultivate heightened interest in the teaching of economics and the scholarship of teaching.

Pedagogical issues will be a central feature, and will encompass work on the teaching of economics in diverse contexts, including large and small classes, undergraduate and postgraduate classes, distance learning, issues confronting foreign students on-shore and off-shore, and issues related to the teaching of fee-paying MBA and other post-graduate groups from diverse disciplinary backgrounds. Though economics is the prime focus, consideration will also be given to work on other subjects that have a demonstrated relevance for the teaching of economics.

Such issues will also involve evolutionary issues in the teaching of economics, in terms both of effective ways to teach evolving theory and of evolving technology with which to teach that theory (including on-line teaching).

Recognition will be given to the fact that economics as a discipline has not fared well in CEQ results (course experience questionnaire
results) since the reporting of those results began in Australia. Nor has economics teaching typically been well received in the USA or UK, according to survey evidence. In that context the relevance to teaching of changing administrative arrangements in universities will also be highlighted (eg in terms of contemporary quality assurance procedures and other government policy changes in Australia and New Zealand).

2. Report research on the nexus between teaching and research (including research on the diverse, changing and potentially conflicting incentives within the academic industry). Papers exploring the extent to which research and teaching activities are complementary or competitive will be welcomed.

3. Recognise the relevance of some more deep-seated implicit assumptions and issues of economic philosophy embedded in what is commonly taught, (as in Sen’s work on economics and ethics, for example). Inter alia, the question arises as to the way in which students respond to economics taught as a path to scientific certainty, as against economics taught as reflecting unsettled debate and vigorous controversy.

4. Recognise the place of history in the teaching of economics. Both HET and economic history tend to play a diminishing role in professional economics training, as emphasis on technique dominates. This a-historical approach to the teaching of economics has been criticised by many influential economists (including Joan Robinson, Leontief, Myrdal, Colander, and Robert Clower in his acerbic remarks about the value of much that is published in such prestigious journals as the AER). This line of criticism has been continued in the recent growth of heterodox economics associations in a number of countries (including one for Australia and New Zealand) and on the web through the Post Autistic Economics (PAE) newsletter. Historical and institutional factors will thus provide one focal interest.

5. Recognise interdisciplinary issues important to the presentation of economics in various contexts. On the one hand, economics students are not systematically exposed to the insights of other social sciences and the conformity or otherwise of their conclusions with those of economics. On the other hand, other disciplines within the social sciences and humanities (e.g. the Social Work profession) do not always include even an introduction to economics for their students, notwithstanding that economic issues are often very important
determinants of the environment within which they operate. More fundamentally, questions arise as to whether social science is more than the sum of its respective parts, and as to whether the roots of economics can be fully understood in isolation from the history not only of economics but also of politics and philosophy.

6. **Establish a link to the teaching of economics in the secondary schools**, given that tertiary enrolments in economics reflect fluctuating enrolments in economics in the secondary schools.

7. **Encourage on-going surveys of student response to the teaching of economics** across Australasian (and other) institutions, including response to experimental teaching and to differences between institutional approaches. (c.f. Colander and Klamer’s 1988 survey of economics students at USA ivy league institutions.)

8. **Monitor trends** in the teaching of economics **both globally and in the Australian and New Zealand university systems** (such as enrolments, staff-student ratios, international-domestic student ratios, offshore offerings etc), and the implications of those trends for various funding arrangements.

9. **Promote a series of papers on specialised themes within the overall province of the teaching of economics** e.g. on the teaching of Principles courses, the teaching of History of Economic Thought, the teaching of intermediate microeconomics and macroeconomics, the teaching of development economics, and likewise regarding teaching in such streams as Quantitative Methods, large first year classes, non-English speaking background students, the teaching of economics to non-economists, product differentiation in teaching economics, and professional education in economics in executive education programs outside conventional university contexts.

10. **Monitor the measuring and rewarding of quality (economics) teaching** within Australasian universities.
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SILVER LININGS: TEACHING ECONOMICS IN TIMES OF CRISES*

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ABSTRACT

Though a disaster for most of the population, severe economic recessions and other crises present an opportunity for the classroom. As job prospects disappear, students become more interested in understanding how the economy works and what might be done to fix it. This provides direct applications for macroeconomics courses, especially those focused on macroeconomic policy, courses in financial economics, and money and banking courses. Applications to a wider range of courses are less obvious. In this paper, we demonstrate how the recent financial breakdown can be used for a third year industrial organisation course. Focusing on the economics of contracting, examples are provided that make the core theories and ideas of the subject more comprehensible by providing the equivalent of a virtual laboratory playing out the principles underlining the course material.

Keywords: Teaching economics, economics of contracting, economic crises.

JEL classifications: A22, L14, L51

1. INTRODUCTION

Economics is more easily grasped by using everyday examples to convey the basic ideas of the discipline. The subject purports to be an applied field of knowledge and students’ imagination, intuition and
understanding are best caught by demonstrating how this approach to concrete observation can make sense of everyday life. Given that almost none of our students are destined to become academic economists, then the best we can do is to give them something of lasting value. That would be to develop some very basic economic intuitions which would allow them to apply this form of analysis to the everyday events of their lives, whether these involve their working or personal lives. Thus, pointing out that profits at some fast food outlets have been rising as many world economies go into recession is a clear way to get across the idea of the income effects on inferior goods, what we mean by an inferior good and income elasticity of demand. Similarly, the significant increase in tertiary enrolments in the US during the recession starkly underlies the role of opportunity cost in forming incentives and moulding behaviour.¹

Nothing is worse for the classrooms than good times. When the economy is booming and job opportunities are open to even the most lackadaisical and uninspired student, interest in the workings of the economy plummets as students queue for training that will give them credentials into either the finance or accounting industry.² However, this reality changes dramatically as storm clouds grow and employment prospects dim. Any crisis, breakdown or infamous public event then provides an instructor with a truly wonderful opportunity. Times of serious stress serve to clarify, if not underline, corresponding economic relations. The silver lining to any economic storm is that it

¹ Undoubtedly falling job prospects make delaying job hunting attractive. “Almost 40 percent of the nation’s 18 to 24 year-olds in 2008 were enrolled in college, a record number, according to a Pew Research Center report. The rise was driven almost entirely by a surge in students attending community colleges . . . The previous record for college enrolment among 18 to 24 year-olds was 38.9 percent in 2005” (Lewin, 2009).
² Over the years, the majority of our students attending a variety of institutions have been finance and accounting majors. These numbers have increased over the last decade as the percentage of GDP generated by finance-related activities has increased in such countries as the U.K., U.S., and Australia. From talking to them, we have noticed how many of these students seem overly focused on gaining credentials. Given this overriding objective, the resulting rational strategy entails passing courses while expending a minimum of effort. Moreover, the prospect of easily obtaining a well paying job in the accounting or finance sectors inevitably draws a number of students who have no intrinsic interest in the course material. To this pool of ennui it is necessary to add the basic willingness to discount or even ignore economic issues when the economy is largely ticking over. Under these circumstances, a required economics course is too often reduced to a distasteful barrier that must be hurdled. Arousing interest under these conditions will be uphill work at best.
concentrates students’ attention. They have either read or heard about the situation in question and are likely to be somewhat curious and even eager for an explanation that extends beyond media headlines. So in teaching a section on corporate governance, we gave daily thanks to the crooks and incompetents at Enron Corporation for providing us with almost daily examples of the consequences of failed governance structures. We also welcomed with open arms the subsequent discussions about what, if any, role government should play to rectify this objectionable mess.

Given the current financial crisis and economic plummet, we should naturally expect to see renewed interest amongst students in economics, driven by a combination of curiosity and a fear for the future. (A number of colleagues have noticed a striking increase in student responsiveness in some of their classes.) The current environment, of course, opens up a number of obvious possibilities for teachers of all things macroeconomic, as it is possible to use current events when discussing how business cycles and monetary systems work. And the ongoing and often fierce debate around policies to alleviate the crisis is also tailor-made for a good many macroeconomic lessons. The natural extension is then to courses on financial economics, monetary economics and banking since it was the financial system that lit the fuse on our latest economic debacle.

But those of us who toil in the more closely observed fields of all things microeconomic should not think that opportunities are less than abundant in their chosen fields of endeavour. What has occurred also says something fundamental about the inner workings of markets. And since microeconomics is fixated on the way in which exchange takes place, the silver lining of economic disasters extends more broadly than we would think if we stuck only to the superficial and more obvious parallels. Clearly the fast food illustration demonstrates one small example. But to provide a broader view, we would like to explain how we made use of what were then only growing difficulties in the subprime market throughout the entirety of our industrial organisation course.

2. EXCHANGE: THE SOUL OF ECONOMICS

What is a cynic? A man who knows the price of everything and the value of nothing (Oscar Wilde 1892, Lady Windermere’s Fan: Act III).
For a number of semesters, far more than we would like to recall, we have given a third year industrial organisation course. This is a required course at Macquarie University for students doing an economics degree and numbers have ranged over the years from 130 to 315. The purpose of the course is to apply the training and knowledge students have received in the previous two years to analysing and resolving problems they would be likely to run up against in business and everyday life.

Far from the standard industrial organisation course, we conduct one focused on the economics of contracting.\textsuperscript{3} Instead of a traditional unit that often seems composed of separable topics, we focus strictly on one issue. Contracting lends itself particularly well to this approach since exchange lies at the heart of all microeconomic analysis. A contract in this case simply explicates the terms of exchange, namely, what flows of services are received at what user cost.

Therefore, after laying out why contracting lies at the heart of microeconomics, the question becomes what facilitates and what impedes contracting. The overall framework is to first understand the strengths and weaknesses of market contracting. This will then provide the basis for analysing why alternative governance systems like firms or government can under the appropriate conditions assist markets in facilitating exchange. The initial stage of the course then requires constructing a contractual framework of analysis by first pinpointing the potential impediments to contracting. These are what Ronald Coase (1937) first identified as transaction costs, reflecting the fact that exchange can’t be accomplished costlessly.

Pulling apart the nature of those costs lays the groundwork for the rest of the course. At the heart of contractual problems lies the informational impasse. Too often economic agents act on insufficient\textsuperscript{3}Fortunately the text by Martin Ricketts (2003) lends itself quite easily to such a focused course. However, as much as students like to use texts as a sort of life saver to keep themselves afloat, a sole dependence on such a book would by itself be insufficient. The reader/workbook prepared for the course is equally important. Each week’s material provides a couple of journal type articles which look at textbook issues in more depth. But also included is a series of short articles from the business press which serve as case studies illustrating for instance the contractual problems arising from property rights. These allow students to apply the framework propounded in the text. They also involve up to date issues. In 2009, many examples were drawn from the economic crisis. For instance, in discussing what is known as the make or buy decision facing a firm, an article in The Economist (2009) would be appropriate. It discusses how the current downturn is leading a number of firms to outsource their asset maintenance. This nicely illustrates not only the determinants of such decisions but what can cause them to change.
information and even worse, information is not equally distributed to one and all. Rather, information can be utilised by one party to the detriment of another. Of course, were all such information difficulties to vanish, so would the issue of transaction costs since with both parties able to anticipate outcomes, exchange would flow without difficulty.

But given the reality under which markets operate, opportunities to dissemble arise and property rights are inevitably violated. Informational shortcomings allow parties to an exchange to fail to live up to the terms of the contract, whether explicit or implicit. Thus exchange becomes risky in that whether the contract will be kept and to what degree ceases to be a matter of certainty. Starting with informational limitations, contracting will inevitably encompass the issues of property rights, opportunism and risk. All of which moves students away from the frictionless world of first year texts and into the rather grubbier world in which economic agents are forced to operate.

If we then add that information difficulties create a potentially poisonous aura for sunk cost investment, the picture becomes complete. In this environment, sunk costs imply that the cost of entering a market is not necessarily identical with the cost of exiting. Switching is not costless and long term investment contracting takes on an added degree of risk, while competition is potentially stymied through the advantage of incumbency.

Problems, though, create the possibility for solutions or else entrepreneurs would serve little purpose in a market economy. Despite difficulties, it is possible to increase flows of information. Clever signalling will surmount even the most intransigent barrier. By looking around, students can easily recognise the omnipresence of all the constant semaphoring that underlies any successful economy. It can be warranties, deductible car insurance, or sunk cost advertising that shifts the risks and penalties of contractual failures to the party holding the deeper degree of information. Thus trust is generated where one party knows it is in the interest of the other party to uphold contractual responsibilities. The logic of this approach leads to a more formal generalisation in the shape of the agency problem, which is the classic conception of one-sided or asymmetric information. Since in the widest sense, exchange inevitably involves making use of an agent, at least implicitly, contractual problems can be overcome to the
degree that proper incentives are provided. An incentive contract therefore makes it in the agent’s own interest to do what the contractual principal wishes. That this is not easily or simply done becomes apparent when constructing a formal agency model. (The preference is to use a graphical model since this tends to be a bit more intuitive for undergraduates given the prevalence of math phobia and the abstractness for students of functional forms.)

The issue of agency becomes the organising principle behind distinguishing firms from markets as governance structures, the issue of why firms exist. Under certain circumstances, the hierarchies that define firms can create, monitor and execute more effective incentive contracts to overcome the essential agency problem. This initial understanding branches out by explaining the way in which this same insight pertains to labour inputs and to other assets, including questions of corporate structure and shape. Lastly, corporate governance involves the attempt to operate an efficiently structured firm by resolving the inherent conflict between professional management and corporate ownership.

Having looked at the alternative governance structures (firms and markets), the final step is to include that agent which is able to set rules for any other governance structure, almost by definition a country’s government. Governments have the unique ability to change the terms of any contract through changes in the regulatory regime. Since any change in contractual terms will change the flows of service and associated user costs, such intervention inevitably creates winners and losers. Using resources to try to influence governmental decisions (rent seeking) is then endemic to such a system. The ultimate economic question posed by the course is then clear: What mixture of governance structures will yield the best results for those living in a given economy?

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4 In a simple-minded way, government is a collection of individuals who together ideally act as agents carrying out the collective choices made by the public.

5 These of course do not exhaust the list of vital governance systems. Mention is made of the non-profit sector and the most fundamental and oldest such structure, namely the family. It is particular useful to employ the family to illustrate how the role of such systems change over time. With the rise of two income families, services traditionally provided in-house by family members are now contracted out. Cleaning, cooking and yard work are obvious. But more and more aspects of child care are also dealt with by outside firms. These include not only looking after children but teaching them to swim or ride a bike, providing them with birthday parties and a variety of forms of entertainment. As families become income-rich and time-poor, such services can only increase. However, during economic hard times many of these aspects will be done in-house once again.
This very sketchy description of the course provides the basics of what we seek to accomplish each year. Clearly, the affinity with and practical application of the current crisis is apparent. The financial crisis is best understood as the inevitable outcome of misleading information which persuaded economic agents almost deliberately to ignore contractual risk. Property rights were often ill-defined, altering what would normally be entrepreneurial incentives into those that encouraged opportunism instead. As the underlying financial fragility developed, sunk costs left too many participants wedded to a very narrowly defined environment. They retained too little flexibility to deal with what in retrospect could be seen as inevitable, yet largely unanticipated, change. Contractual incentives encouraged financial agents to gallop relentlessly off a clearly defined economic cliff. The next section demonstrates how the course material lends itself to such a discussion.

3. WOULD YOU TRUST THIS MAN TO SELL YOU A USED CAR?: CRISIS AS AN APPLICATION OF RISK AND TRUST

Experience is the name everyone gives to their mistakes (Oscar Wilde 1892, *Lady Windermere’s Fan*: Act III).

A few examples can help to explain our basis for claiming that any crisis should be grist for the economic mills of classroom work. Again, it does not necessarily have to be limited to the most obvious courses. Almost any lecturer, with a little ingenuity, can find fertile ground within the cataclysm provided by a full blown crisis. In fact, the worse the economy grows the more an academic economist thrives.

To make the contractual issues of the course more concrete, students have a packet of readings to go through each week in addition to their textbook assignment. In their very first week, they come across an article by Donald Cox (2003) entitled “The Economics of ‘Believe It-Or-Not’”. This provides an economic rationale for why people hold certain beliefs and why it is often difficult to convince them to switch away from erroneous beliefs. In the course framework, contracting depends on both parties holding the common conviction that the proposed exchange will be mutually advantageous. The basis for such a decision depends on the anticipated flow of services versus the estimated user cost of contracting. The bias will always be toward known or conventional behaviour.
The key is a simple one of opportunity cost, namely what people think they are giving up or stand to lose by switching their beliefs. Cox argues this point clearly using a simple example. Children will stop believing in the tooth fairy before they give up jolly old St. Nick. In terms of the opportunity cost of surrendering beliefs, they have little to lose if they stop playing the tooth exchange game but a great deal if Santa Claus becomes a mythical individual. It is easy to see how this ties in to holding conventional views and the frequency of herd-like economic behaviour. Keynes, in his depression-inspired *General Theory*, saw conventions as being a key to economic stability, but also as capable at times of leading to wild speculation and a resulting collapse. Bankers and financiers would continue to operate in the same way as their professional peers because they are convinced that they have much less to lose by doing so. While someone who is brave enough to go out on a limb is excoriated when proven wrong, there is less shame attached to failure if most others are all in the same sinking boat.

For it is in the essence of his behaviour that he should be eccentric, unconventional and rash in the eyes of average opinion. If he is successful, that will only confirm the general belief in his rashness; and if in the short run he is unsuccessful, which is very likely, he will not receive much mercy. Worldly wisdom teaches that it is better for reputation to fail conventionally than to succeed unconventionally (Keynes 1936, pp. 157-58).

Students can then, through the proper discussion and questioning, be brought to see how supposedly smart operators in the financial sector could keep collateralised debt obligations (CDOs) comprised of sub-prime mortgages. This explanation relies on a core principle of the course, namely, that to understand an agent’s behaviour, it is essential to analyse the contractual incentives under which he or she is operating. The profits were enormous and so were the bonuses being accrued. The belief that these financial instruments were low risk because the risk was spread so widely was a difficult one to shake. This conviction was too convenient not to believe. Reversing course would, for instance, see their investment bank or other financial institution badly underperform those who were operating in this market with what would turn out to be bold disregard. Not only would the value of their shares lag behind the leaders, but they would

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6 Later lectures use such thinking as a starting point for examining the relationship between sunk costs, quasi-rents and switching costs. Such constraints will give rise to specific forms of contracting.
deliberately deny themselves bonuses attached to this policy of undervaluing inherent risk. Even if one suspected an eventual collapse, the cost of no longer believing in the guiding financial wisdom would simply involve too great a loss. In terms of the Cox (2003) piece, jolly old St. Nick must not, despite indications to the contrary, be denied. Once a housing bubble begins, driven by an easy lending regime, it is hard to get it back under control since those profiting from such a belief find it too costly to surrender their conventional wisdom.

We can easily bridge this initial discussion by entering into a more fully fledged examination of the sub-prime lending fiasco when introducing the principle/agent model, which forms the analytic heart of the course. Here we can use an article published on the web by the Wharton School of Business. In an analysis entitled, ‘How We Got into the Subprime Lending Mess’, Susan M. Wachter is widely quoted to provide readers with a simple primer of the problem. On reflection, a classic example of poor contractual incentives involves the usual suspects, namely elusive information combined with undervalued and poorly defined risk. These in turn, when associated with badly construed property rights, provided a fertile ground for opportunism. Such sub-prime mortgages were typical incentive contracts, but with the incentives skewed to deliver potentially lethal results.

The article also offers a clear demonstration of how innovations which reduce the cost of contracting and facilitate exchange can ultimately boomerang, when the proper assignment of risk is studiously ignored. The Great Depression highlighted the shortcoming of the then prevailing contractual arrangements placing too much risk on borrowers, with balloon payments, usually after less than five years, being used to pay off the principal of the loan. In the aftermath of the Depression, and with the post-war period featuring a number of returned servicemen eager to start families and become homeowners, there was a pressing need to facilitate home mortgages and by doing so boost the housing industry. To accomplish this desired result, government institutions created a highly regulated environment that successfully reduced the inherent risk of such loans both for lenders and borrowers. This era ended as financial deregulation changed the prevailing banking environment leading to the

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\[\text{\[\text{This model forms the core of the course since it underlies the idea of a division of labour. Individuals want to achieve given objectives but they choose not to accomplish these desired ends by themselves. Instead they contract out the work to someone else who either explicitly or implicitly acts as their agent. To resolve potential conflicts of interest between a principal and his or her own agent requires constructing an appropriate incentive contract that leave both parties with a strong interest in accomplishing the required objective.}\]

\[\text{This article can be found in an online publication, Knowledge @Wharton (2007) published by the Wharton School of Business, University of Pennsylvania.}\]
Savings and Loan crisis. Clearly, by changing the terms by which contracts can be struck, governments can change both the quantity and quality of contracts undertaken.9

In line with the course’s broader analytic contractual framework, fuel for the sub-prime crisis consisted of badly undervalued risk characteristics of the mortgage market at this time. Neither lenders nor borrowers proved immune. Contract theory strongly suggests that when buyers and sellers seriously underestimate risk, an over-abundance of contracts will be struck. The assigned paper provides a good explanation of why risk was so poorly handled during this episode. Here we can look back to the formation of conventional beliefs. The importance of conventions has been stressed in the previous example. They essentially cut transaction costs by making behaviour predictable. The future is simply assumed to be a relatively smooth continuation of the past. Such an error is endemic to a wide range of long term contracting.

The key in the case of mortgages is what, during the Japanese asset bubble of the late eighties, became known as the ‘myth of the land’. This is an entrenched idea that land prices inevitably will continue to rise. Accepting conventions of this type create a clear contractual incentive to lend and to borrow in the housing sector. Lenders worry less about foreclosing if they assume that the relevant property will simply be worth more than at the time of the original loan. Who they lend to becomes of less importance than the fact that they lend. Quantity rather than quality prevails when lenders believe they are operating with the convenient cushion of an irrepressibly rising housing market. Borrowers feel self-assured when their house represents not simply mere housing but an increasing element of personal wealth. This particular asset creates a fortuitous mechanism through which they can gain expanded credit. Given the comforting belief of assured future wealth, borrowers regard greater indebtedness as not bedevilling them with anything like a serious, let alone a debilitating, risk.

Contractually, a separation of mortgage originators from mortgage lenders also helps to create a distorted set of fundamental incentives. Without having to bear the risk of holding the mortgage itself, originators become focused on generating new contracts. The greater the number of contracts, the greater their reward will be. By being able to shift risk by reselling mortgages to accumulators and repackagers, these non-bank institutions are seemingly able to reap rewards without bearing a

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9 This concept ties in with later lectures examining government intervention into the contractual process. Since changing the terms of contracting inevitably redistributes income, vested interests will have a strong incentive to try to lobby and influence politicians and government officials in the hope of capturing potential rents by doing so.
proportionate amount of risk. The originators then lack any strong incentive to diligently assess the quality of the loan. The possibility of mortgage defaults is of little moment to them. Investment banks and other mortgage purchasers used basic rearrangements of property rights to agglomerate various mixes of these financial instruments. These constructed debt portfolios were then floated by bond offerings which promised relatively high rates of return for low risk investments. Again, the underlying incentives were to push for even more loans which would generate ever higher levels of profits. The attempts to model the underlying riskiness of such financial positions depended on outmoded data based on prior, but non-representative, periods. Students can grasp that the combination of bad information allied with incentives stressing current competitive gains will lead to an under-evaluation of risk and an abundance of questionable contracts.

Skewed incentives and information problems equally existed not only on the lending side of mortgage contracts but almost symmetrically on the borrowing end. As the Wharton article (2007) points out, potential home buyers were lured in by loss-leader rates in the early years in the hope of making up the difference throughout the remainder of the contract. After the first two or three years, annual rate adjustments made repayment obligations increasingly onerous. Simultaneously, borrowers were locked out of refinancing alternatives by prepayment penalties attached to such options. Borrowers, even relatively sophisticated ones, did not completely comprehend the risk they had to shoulder when rates rose. This was even more the case for the many first time homeowners who often remained clueless about questions of risk. Should they run into difficulties, as many did, all lenders could do was to foreclose the property. In many of these non-recourse loans, the borrowers were not obligated to make good the difference between the deflated worth of their homes and the original mortgage agreement. As students were easily able to note, this created an incentive for borrowers to act irresponsibly. They could enjoy their new homes during the initial years and then walk away when conditions turned

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10 Ultimately these lending decisions come back to haunt such originators. Passing on too many dubious mortgages threaten the viability of the lenders. As credit dries up, mortgage brokers will find consequently that their very business is vanishing. Without cash flow, their middleman position becomes an irrelevancy.

11 Many of these loan packages had ‘teaser’ introductory rates which made the mortgages appear to be affordable. After the initial period, interest rates ramped up. The potential returns were thus attractive as long as widespread foreclosures were not in the cards. The risk of these newly hatched homeowners being unable to meet their payment obligations was consistently underestimated.
adverse. In essence, they could regard their mortgage contract as minimally
providing them with subsidised accommodation.12

The next set of examples uses three articles that pinpoint key corporate
governance issues, basically concerning how to provide the right incentive
contracts for top level executives. These readings again focus attention on a
key element of the course, namely the painstakingly developed principal/agent model. At the heart of many corporate scandals lie
incorrectly specified employment contracts with distorted incentives
yielding outcomes undermining shareholders’ wealth. These also
contributed to the irresponsible behaviour that motivated the subsequent financial crisis.

The first article (Bowley and Anderson 2007), ‘Where Did the Buck
Stop at Merrill?’, looks at a particular case of governance failure,
specifically, whether the board of directors properly played its oversight
role as the shareholders’ agents. This continues the discussion on the
principal/agent model, dealing with the potential conflicts of interest such
agents face. The fact that on 20 October 2007, Merrill Lynch’s chief
executive, E. Stanley O’Neal, stepped down under pressure from the board
supposedly vindicated its oversight effectiveness.13 But on closer
examination, the article raises questions concerning the actions of both the
finance and audit committee. Merrill had chased profits by becoming the
top issuer of CDOs. Profits soared. Those derived from fixed income
instruments jumped in the second quarter of 2007 by 201 percent.14
Questions were being raised elsewhere in the firm about the attendant risk
of this strategy. Yet the board remained quiescent. Students are able to note
that such higher rewards must at least present the possibility that the
 corporation had to be shouldering a comparable increase in risk. Yet no one
on the finance or audit committee saw reason to check that appropriate risk
control mechanisms were in place. The fact that many board members were
friends of Mr. O’Neal immediately raises the question of whether such
directors found it convenient to look the other way until an October
announcement of a $8.4 billion dollar write-down tipped their hands.

12 How many borrowers cynically saw a nonrecourse loan as an opportunity to rent a home for a
reasonable rate while the good times lasted, or what proportion convinced themselves that they
would be able to meet their obligations, is of course impossible to determine.
13 The fact that O’Neal was replaced by Richard Thane hardly speaks well of the board’s hiring
committee. After leading Merrill Lynch into the arms of the Bank of America, Thane in turn
was forced to resign as tales of his extravagant leaked into the press. Given that by 2009, Bank
of America, like a number of its peers was largely being kept afloat by the U.S. government,
such studied arrogance did not go over very well. This came on top of a less than enviable
management record at Merrill Lynch. Noted was the fact that Thane forced through $3.6 billion
in executive bonuses as his firm was failing and being taken over by Bank of America, assisted
by a $45 billion federal bailout.
14 The increase is a comparison of the second quarter of 2007 with that of 2006.
The second article (Krugman 2007), ‘Enron’s Second Coming?’, takes up the tale of executive malfeasance by tying in the behaviour of Countrywide Financial’s Angelo Mozilo with the opportunistic strategy of those leading Enron at the beginning of the decade. Here students can begin to comprehend how contractual incentives can fail to resolve conflicts of interest. By serving their own ends, chief executives can undermine the objectives sought by shareholders. Mozilo, for instance, used corporate funds to buy back stock at more than $40 a share immediately before Countrywide’s exposure to the subprime market became widely known. Opportunistically, Mozilo used this buyback strategy to unload $138 million of his own shares in the company. It would appear that he deliberately used corporate (shareholder) funds to essentially sell his stock at an inflated price. This underlines the problem of trying to align the objectives of executives with that of shareholders. Mozilo was interested in profits but the attractiveness of short run boosts outweighed any more cautious strategies. By being able to shift the risk of dubious strategies onto Countrywide’s shareholders, Mozilo was emboldened to take unacceptable risks, at least unacceptable from the standpoint of those shareholders.

The last article (Norris 2007), ‘Given the option, bosses take wrong sort of risk’, reinforces the point that executive pay had poorly aligned contractual incentives. It reports the work of Sanders and Hambrick which pointed to the fact that chief executives receiving more than half their compensation in stock options were much more likely to make bigger and riskier acquisitions. The intuition here should be clear. These chief executives’ incentives meant that they suffered no greater penalty in terms of their options if their decisions led to small or large losses. However, while there was little downside risk, the upside returns were larger the greater the risk taken. That downside risk had inadvertently been left to shareholders to bear. Basically the contracts provided strong incentives for executives to do anything feasible to boost profits. Students will then find it unsurprising that executives whose compensation depends heavily upon options are more likely to commit accounting fraud. The lesson to be drawn should again be clear. The unintended consequences of trying to align the interest of both the principal and agent can seriously backfire when incentives aren’t carefully sculpted to forestall opportunistic behaviour.

The point of all these examples should be quite plain. They effectively illustrate that the financial crisis provides timely fodder for explaining the
key concepts of the course. Many of the business articles about sub-prime mortgages served as applied case studies of the contractual framework painstakingly developed during lectures. These cases were sometimes used to start off a lecture. They provided linkages to material covered or they previewed forthcoming issues. Such concrete examples proved most valuable by allowing students to grasp how you actually apply economic analysis to understanding specific and very common problems.

4. ELBOW GREASE: HOW FAR CAN WE EXTEND SUCH APPLICATIONS?

Education is an admirable thing. But it is well to remember from time to time that nothing that is worth knowing can be taught (Oscar Wilde 1894, A Few Maxims For The Instruction Of The Over-Educated).

It is almost self-evident that learning by doing represents the best hope of having students actually grasp a subject. The idea that students are empty vessels to be filled with the lecturer’s own wisdom is too foolish to be pursued. Also it is important to remember the goals and objectives of our students. (By this I don’t mean the cynical dismissal that all they want to do is to pass the course while putting in a minimal amount of work.) Surprisingly, many of them want to be confronted with interesting material that makes them think. True, a number of students will grumble if forced to exert extra effort, but even these will in retrospect consider that effort well worth it, if in turn they gain some useful insights. The degree to which we have been successful can best be measured by the number of former students who have informed us that they considered this course to be the most valuable economics unit they took, since they were able to use the analysis and associated structured thinking in their actual jobs.

The course is particularly geared so that the more students actually go through the numerous application cases, the greater the probability they have of passing, let alone gaining something from their experience. We can still remember one student, not necessarily an outstanding one, who came back to see us the following semester. She had done well on the final exam and in the course generally. The secret of her success was that at the

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17 Learning by doing in education is a simple application of the idea that has proved so successful in the workplace. Toyota’s rise to global dominance among car manufacturers was built on the kaizen system which focused on continual improvement through learning by doing. This proved the key of making the most out of the corporation’s human capital. In economics, Lucas (1988) pinpointed this concept in terms of increasing returns to embodied human capital.

18 To provide an example, one young woman with a full time job was invited to comment on a specific business proposal. Using the basics of the course, she pointed out that they needed to take into account potentially onerous monitoring costs. She received appreciative nods from senior management. The student was bursting with pride when she relayed this anecdote to one of the authors.
beginning of each lecture, when we would give our homely little examples, she would take scrupulous notes unlike others who simply sat on their hands. She said these allowed her to understand how one went about answering the study questions which provided her with pertinent practice for the final exam. As we repeatedly point out in lectures, if you want to be an Olympic swimmer you don’t take out a book the day before a meet entitled, ‘How to Swim’. Instead, you jump into the pool each day and practise swimming. That’s because swimming well is difficult. In the same way, being able to apply economic analysis does not come easily. To succeed you need to constantly practise. It is a clear case of learning by doing.

The one unwavering truth, as pointed out earlier in the paper, is that almost none of our students will go on to become academic economists. This decision should not be scorned. At times, we believe that students should be applauded for showing good sense in at least one instance. But even these students will respond adequately if shown how economic thinking can be applied to very practical situations. We should think of ourselves as trying to teach them a specific and rigorous way of analysing problems. That is why it is important to present students with every day examples and to try to get them to develop a rudimentary economic intuition which would allow them to do some simple analysis. Instead, it is all too common to treat students as apprentices on the road to an academic career. Instead of practical problems we provide them with artificial numerical puzzles to work. This same approach is often reflected by textbooks which are written for academics already familiar with the subject instead of raw beginners. The answer to this conundrum is rather simple. Lecturers emphasize approaches and material that tend to be easy to teach and easy to test. Textbooks, whose key audience are the lecturers, rather than students, reflect and unfortunately reinforce those biases. Yet this is

19 In passing, we should add that this approach also provided dividends to the minority of students with a greater interest in extending their economics education. Such students often remarked that the course helped them to pull together the seemingly disparate elements of an undergraduate education. Even more important, the course helps to develop a feel for economics, a basic nurturing of economic intuition. Becoming a competent technician is insufficient if one lacks a sense of how economic institutions actually work.

20 This is a nice example of the agency problem, one that provided us with a good study question for students. Lecturers ostensibly act as agents for students in choosing a textbook. This is a sensible option since, by definition, students would be hardly qualified to make an informed decision in this case. However, there is a potential conflict of interest as lecturers will tend to let their narrow self-interest override the aims of their students, at least to some extent. Publishers, focusing on seeing their texts adopted, will therefore tailor them to promote the goals and convenience of the lecturers (the selectors) rather than those of the students (the actual purchasers). For a discussion of this agency problem see Freedman (2003).
the exact approach that makes economics so forgettable for most students.

The intent is not to create student interest or enthusiasm by explicating the way in which a basic grasp of economics will give them a wider understanding of the world in which they live. Instead, economics is taught as a collection of irrelevant and disconnected models and algorithms. These appear like characters in an Ionesco play. They often seem to students to have no particular relevance to what precedes or what follows. However, teaching one model after the next has an obvious virtue. It is easy to go through them step by step and even easier to devise model-based test questions, which are joyfully easy to mark and, even better, also lend themselves to multiple choice questions. What they fail to do is to promote understanding or interest in economics amongst the vast majority of students.

Using current events, like a financial or economic crisis, not only grabs students’ attention but also allows for questions which induce students to apply the approaches developed in the course to actual issues. An effective method to promote this flavour of providing a hands-on approach (besides using such questions in tests) is to post a question of the week on an electronic bulletin board and encourage students to respond to, and particularly to reflect on, the answers given. Lecturers keep the conversation going by effectively commenting on the responses, but more importantly by asking students to clarify their answers and in turn asking further questions based on these responses. What is crucial is not to provide definite answers because that tends to end the discussion as most students will simply take a lecturer-dictated answer as holy writ. Few students have the self-confidence or willingness to question a lecturer’s claims. Besides, one of the goals of any lecturer should be to disabuse students of the notion that economics resembles math in providing its practitioners with right answers.

Students then are encouraged to get their hands dirty by tackling the sorts of problems presented by their weekly readings. This objective is accomplished by providing them with numerous opportunities. Each week’s readings have four study questions attached which present fabricated mini-case studies which directly or indirectly refer to their readings. A question of the week posted on the student bulletin board allows students to attempt the question and other students to respond to

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21 There are numerous factors that lead to making a course in economics boring. But lecturers that gear presentations to the ultimate ease of teaching and testing will be committing a cardinal sin. Material that fits this classification is often only grist that student memorise in order to get through the course. Such courses are quickly forgotten, leaving students without a glimmering of the economic intuition needed to approach practical problems.
these attempts.\textsuperscript{22} The overarching incentive to use these opportunities is simple. Their exam involves analysing small case studies which we create. To survive such an ordeal, students must understand basic contractual relations. Memorising will serve no purpose and in fact will only detract from their responses. The only effective preparation is through practice, essentially learning by doing. This is made sufficiently clear in both the course outline and throughout the course itself.

The following four study questions provide a representative sample of the types that assist students to become adept at analysing contractual questions. They clearly refer to the ideas buried in some of the previous readings cited. Note that all questions draw on the ideas presented throughout the course, which is a distinct advantage of having a highly unified structure focused on a single subject matter.

- “The current tendency to blame the boards of financial institutions for the current mortgage crisis is entirely overblown,” claims Dean of Management (Wottsamatta U.) Sivad De. “We are making a big fuss over a very few bad peach pits. Of course it is easy to point out mistakes retrospectively. And certainly some financial institutions took what turned out to be unwarranted risks. But these were only honest mistakes. It is nonsensical to expect boards to always know what the right path should be. Moreover there is little to no incentive for such boards to condone mismanagement. The members of these boards have nothing to gain by doing so and risk losing their reputations.” In response, corporate watchdog, Metz von Flattua, stands up in the middle of this speech and throws a custard cream pie into the surprised face of Dean De. Can you try to provide a more explicit basis for Ms von Flattua’s unorthodox response to Dean De’s claims? Use contractual analysis to evaluate this issue.

- “Chief executives are only as good as the corporation they run. So the focus on corporate governance is too obsessed with monitoring and controlling chief executives. Most chief executives are too prone to take credit for successes beyond their control and to excuse failure by blaming uncontrollable circumstances. In fact they are less influential than they would have many investors believe. That is why the quality of corporate governance is far less important than so many politicians and academics seem to believe. All this focus on

\textsuperscript{22} Our role as moderator is to encourage such attempts and respond to them by asking for additional clarifications. We avoid presenting an ‘answer’. Two related reasons make set answers counter-productive. It stops discussion dead. Students also think there are correct answers and fall back on memorisation. This contradicts the whole notion that the goal in tackling a question is to provide good analysis. Answers are not seen as right or wrong but the product of either good or bad analysis.
improving governance and providing more effective regulation is largely wasted time.” Dr. Dadnor Savitz is well known for her outspoken and counter-intuitive theories. Is her view on corporate governance correct? Please use your knowledge of the contractual framework to evaluate her ideas.

- Rancorous shareholder, Al Kafloop, accuses corporate executive compensation packages of being counter-productive. At the shareholders’ meeting of Stuffit Inc., Al inveighs against the lucrative pay package offered to the top executives. “Compensation packages are meant to provide incentives for executives to boost shareholder value. They are not supposed to be focused on providing gravy trains for fortunate managers. In the proposal presented by our company’s board of directors, the compensation packages seem more like an attempt to legitimise any opportunities executives have to loot shareholders’ assets. Clearly the Board is not working in the interest of its shareholders but rather to allow these executives to take home unearned rewards.” Please evaluate Kafloop’s claims using the contractual framework.

- In testimony to a joint committee of the Uzbekistan National Congress, respected academic, Lars Rigngold, claims, “Better corporate governance must mean a higher risk of having chief executives terminated. The higher levels of compensation we have all observed in recent years merely reflect an improvement in corporate governance. In other words, bearing an increased risk must translate into higher levels of compensation. Therefore it is by definition absurd to claim that current executive rewards are unreasonable. This current debate merely reflects the sour grapes attitude of most investors. These poor sports are more willing to blame chief executives than to bear the consequences of their own poor decisions. No one should pay attention to such infantile whining.” Should infantile whining gain attention? Use the contractual framework to evaluate executive compensation packages.

5. CONCLUSION
Useful material can always be drawn from daily events. Of course, vivid events like the current crisis are even better as they attract student attention and magnify economic issues. There is a parallel here between the teaching of mathematics and economics that few practitioners are cognizant of or perhaps care to recognise. Mathematical problems are often best approached by first using numerical examples to understand the way in
which fundamental relationships operate. It is easier to move from the concrete to the abstract and general than to travel the opposite route.

Likewise, the teaching of economics needs to be grounded in problem solving. Students grasp economic relationships best by seeing concrete situations. For most students, economics is best understood as a way to analyse specific problems. Models shouldn’t be presented as an end in themselves but rather as a useful mechanism by which to approach previously presented problems.

Students have usually found our course in the economics of contracting to be the most difficult one they had encountered, but the one economic course that stuck with them in later years. They have often appreciated the current examples plucked from yesterday’s news and the practicality of the course. For instructors to take this path involves hard work on their part, as well as that of their students. This approach may in fact be a higher risk strategy than the standard structure of most courses. But as any economist knows, from higher risk comes the possibility of higher rewards.

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23 A former student visiting from Singapore informed us that, even six years after graduating, when he and his friends meet, they still talk about our course in industrial organisation.


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

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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

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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 \textit{not} generally well exposited 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 \textit{complex}.

3. The concept is not a fundamental concept in contemporary orthodox economics, but either a \textit{subsidiary} or \textit{optional} one.

4. A good understanding of the concept is \textit{not} necessary for a successful career as an economist.

\(^1\) See Ferraro and Taylor (2005, p.1) which cites, \textit{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, \textit{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. 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.\footnote{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.}

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
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. 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.

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

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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

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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 everyones’ 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

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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. 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’.

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

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

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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.\textsuperscript{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.\textsuperscript{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

\textsuperscript{13} This topic will be analysed in detail in a later paper.

\textsuperscript{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
EMOTION AND EMPATHY AS PEDAGOGICAL TOOLS: INSTRUCTIVE ACTIVITIES IN TEACHING INTERNATIONAL AND DEVELOPMENT ECONOMICS*

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ABSTRACT

Empathy and emotion are normally viewed with scepticism in economics, partly due to the positive/normative distinction. However, harnessed appropriately, empathy and emotion can be powerful pedagogical aids. This paper describes two teaching activities where students learn about poverty, equity, welfare and rights-to-pollute in affective ways. This approach enables them to develop a deeper understanding and to think more critically about subject content.

Keywords: undergraduate teaching, social values, distribution, poverty, emissions trading, worldviews, critical thinking.

JEL classifications: A13, A22

1. INTRODUCTION

Empathy and emotion are normally viewed with scepticism in economics, partly due to the positive/normative distinction. Since, on that view, it is possible to discuss the state of economic affairs without referring to a worldview or value system, why clutter analysis with

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1 This distinction has a long history, going back at least to Hume’s (1739/1740) Treatise on Human Nature, Book III, Part I, Section I.
elements that can so easily lead to rash judgments? Even if one accepts the fact/value distinction, and pursues a research program of positive economics, it does not follow that an appeal to values can be useless for pedagogy.² As noted by Ramsden (2003, p.93): ‘Even more important [than clear explanation is] ... the related ability to make the material of a subject genuinely interesting. When our interest is aroused in something, whether it is an academic subject or a hobby, we enjoy working hard at it’. In this paper I describe some of my teaching practices which evoked genuine interest by ‘addressing the heart’ to some degree. I argue that, by being affective, these approaches to teaching are actually highly effective.

When students articulate their values, it also provides a natural context to discuss distribution, alongside concerns about efficiency. Students are often passionate about distribution, feeling the sting of injustice towards themselves or others, but some students believe that economics subjects do not allow a space for them to voice their convictions:

‘[International Economics] was the first subject I have ever had at UTS that seriously aimed to educate us about poverty, inequality and showed a more ‘human’ side to economics/business.’

_Undergraduate student_

The discussion of values was also important in another way. It led naturally into considering the philosophical underpinnings of neoclassical economics, and some of the criticisms of it as the following quotation from a student who went on to complete a Master of Development at Oxford University indicates:

‘[The lecturer] not only managed to teach the flat [i.e. neoclassical] theory but also to give it shape and texture by connecting it to the real world. Moreover, he opened the neoclassical assumptions to the criticism that is rising in academic debates but is yet to reach most textbooks. As a result, students were engaged and they acquired knowledge that will be valuable to them in their professional life as well as to critically form their personal opinion about policy issues’.

_Undergraduate student_

² Some do not accept the positive/normative, or its attendant Is/Ought, distinction. Coming from a Christian position, Gunton (1993) argues that relational reality, with its Ought, is more foundational than physical reality, with its Is.
The remainder of the paper is structured as follows. In section 2, I outline the subject/student context for the affective practices. In section 3, I describe the practices themselves. Section 4 offers an evaluation of the practices in terms of student feedback and related teaching and learning outcomes, and section 5 concludes. The appendix documents some administrative details and suggested teaching resources.

2. SUBJECT AND STUDENT CONTEXT

International Economics is a third-year subject in the Economics Major of the Bachelor of Business at the University of Technology, Sydney (UTS). It typically attracts enrolments of between 60 and 100 students. The subject explains why countries trade, and, how international economic events affect inflation, GDP, exchange rates, immigration and global pollution. The subject uses Krugman and Obstfeld (2008) as the primary reference text, but replaces the Heckscher-Ohlin model with the Specific Factors Model.3

The pre-requisite for the subject is second year macroeconomics. Students are generally of mixed mathematical ability, so I have to deliver material in a range of ways (mathematically, intuitively and graphically). Students generally enter the subject with an uncritical acceptance of free market liberalism (i.e. neoclassical economics) and the ‘consequentialist’ worldview that informs it.

3. TEACHING INNOVATIONS

The purpose of the teaching innovations is to help students clearly see all the implications of neoclassical economic analysis, including the awkward ones. Two features of the aforementioned quotes outline the strategy to achieve this. First, the students perceive a more ‘human’ side to economics through the innovations. Second, they improve their understanding and critical thinking skills.

3.1 What does a more ‘human’ economics look like?

Rightly or wrongly, the sub-prime mortgage crisis has emboldened many critics of mainstream economics, including the Prime Minister,

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3 Earlier versions of Krugman and Obstfeld had both models, but the Specific Factors Model was later dropped. I can prove the Ryczinski, Heckscher-Ohlin and Stolper-Samuelson theorems graphically with the Specific Factors Model, which is helpful for mathematically weak students.
Kevin Rudd: ‘What we have seen is the failure of extreme capitalism … which now turns to government to prevent systemic failure, the institutions of government that extreme capitalism spent decades deriding’.4 The core idea of mainstream economics is that individual and social life is about the maximization of material well-being through markets. Some scholars find this model too abstract since real societies do declare some matters off limits for markets. A well-functioning judiciary, to give one example, does not sell ‘not guilty’ verdicts to the highest bidder. But how might some of the human aspects of mainstream economics be taught?

3.2 Exploring the Human Side 1: Mild Student Deprivation Leading to Empathy

Many human goals, in both education and life, involve empathy and emotion. If harnessed effectively by a lecturer, they can be powerful aids to learning and understanding. International Economics has an assignment with two options. For both options, students have to live as cheaply as they can for one week, and record their experiences in a journal which forms part of the assignment. Then, they chose either to do the World Vision 40 hour famine,5 or to design a best-response plan if someone asks them for money on the street. In both cases, they have to connect everyday experience to theory. The ‘famine’ students write an essay on world poverty, and the ‘street people’ students write an essay on one aspect of international aid, namely debt forgiveness.

I chose these tasks because I wanted the students to explore empathy with poor people. The advantage for me of ‘outsourcing’ the form of deprivation – i.e. doing a recognized activity rather than running a famine myself – is that World Vision has famine guidelines based on many years of experience.6 For those unable to go without food, the second activity about street people still requires them to think about something ‘close to home’. While I can’t ask them to

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5 I made it clear that they did not have to raise money for the charity.
6 See [http://www.worldvision.com.au/40hourfamine/myfamine_guidelines.asp](http://www.worldvision.com.au/40hourfamine/myfamine_guidelines.asp). I also emphasized that since the objective is to experience deprivation, quitting the famine if it gets too hard is fine. These safeguards seemed sufficient to me to remove the need for ethics committee clearance, though another lecturer organizing a similar assignment might wish to cover themselves by gaining approval.
spend a night on the street or begging for money, I can invite a homeless youth welfare officer to talk with the students.

Both assignments involve the week of self-imposed financial difficulty to help them imagine their lives divested of the privileges we take for granted in 21st Century Australia. In doing so, every student builds an experiential bridge towards seeing the economic milieu of marginalized people in context, rather than in abstract. Further details of the assignment are contained in the appendix.

When students can identify with poor people through a guided experience they are motivated, in a qualitatively different manner, to learn about poverty and to suggest policies for its alleviation. In fact, the exercise reinforces how pedagogically odd it is that distribution is so little discussed, relative to efficiency, in most economics courses.

3.3 Exploring the Human Side 2: Follow your views wherever they go

Mainstream economics is a consequentialist framework focussed on individual utilities. If the consequences of a particular action are good in that they produce a net increase in utility, then by definition it is a good action.7 I respect students’ rights to believe in this form of consequentialism, but I want them to follow its implication right to the end.

I have a tutorial on global warming which accomplishes this. Mainstream economic analysis tolerates pollution because it is not seen as a moral issue; the costs and benefits are weighed and the ‘optimal’ amount of pollution can be derived. Governments can issue ‘rights to pollute’ in a ‘cap and trade’ system (one of the options current governments are considering), and these rights are traded. The system is designed so that those companies who gain the greatest financial benefit from polluting are able to buy them, while guaranteeing the total amount of pollution (the ‘cap’) is optimal. This is advantageous to society, given the standard assumption that the financial benefit of the company adds to social well-being.

In this tutorial, I go through the compelling logic for tradable rights to pollute, and most students have sympathy with the policy. I then propose issuing tradable rights to commit domestic violence in a ‘cap and trade’ system which, for argument’s sake, is guaranteed to reduce the total incidence of domestic violence and thus improve social

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7 There are acknowledged difficulties with consequentialism, including the proposition that ‘ends justify means’, but these are rarely mentioned in economics courses.
welfare. The proposal passes the consequentialist test implicit in mainstream economics because it results in a net increase in welfare. It is hardly necessary for me to make my distain for this proposal clear, for the analogy is never lost on students.8

If it is objected that pollution, unlike domestic violence, often accompanies the production of utility-enhancing goods, I can point out that the enjoyment of domestic violence by some is sufficient neoclassical warrant for a socially optimal amount of it to be produced. If someone enjoys hurting others rather than caring from them, it is as valid, in terms of neoclassical theory, as someone enjoying smoking rather than not smoking. In neoclassical analysis, there does not need to be an extra benefit produced by smoking – it is beneficial solely by virtue of people liking it.

But what of its victims? The harm done to them needs to be taken into account, but their suffering is merely a negative externality of the perpetrator’s pursuit of utility maximization. According to neoclassical theory, the harm inflicted by a perpetrator of domestic violence is, in principle, no different to the harm of my having to endure passive smoking due to my friends’ bad habits. Both smoking and domestic violence need no justification other than their abode in someone’s utility function. Analytically, they can be handled as a negative externality – so that the socially optimal level of the bad can be attained.9 Unfortunately, there is no escape. Neoclassical economics is deadly clear about not judging preferences.

I have a vivid memory of a tutorial where everyone rejected the cap and trade system for domestic violence, except for one student. He kept clarifying with me that the system would really reduce the amount of domestic violence in the thought experiment. I kept assuring him of this, and he reluctantly ended up supporting the application of cap and trade to domestic violence. His clear thinking and his affirmation of neoclassical consequentialism challenged other students to reflect on their own worldviews.

I believe reductio ad absurdum is a powerful teaching device. Furthermore, making students see the implications of their beliefs has an additional educational advantage that it is student-centered

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8 The danger that someone in the class may have been the victim of domestic violence is addressed by pre-announcing that the issue will be raised in the tutorial.
9 If necessary, any net government income raised by a tax could be used to compensate victims.
pedagogy. They are following *their own views* in one area (i.e. cap and trade systems that reduce the total amount of the undesirable thing must be good) to their logical conclusion in another (entirely comparable) area.\(^\text{10}\)

### 3.4 And then think about worldviews

Most commonly, though, students reject the policy. This then leads to a discussion about how many issues are decided by the deep convictions of people – their worldviews – which pre-dispose them to see things a certain way. To really understand the world, one must think about worldviews.

Once the importance of worldviews in acknowledged, so many otherwise puzzling conflicts between groups can be explained. Environmental economists pursue the ‘optimal’ amount of pollution with rights to pollute, while radical environmentalists reject ‘rights to pollute’ because it legitimizes the ‘evil’ of pollution, just as ‘rights to domestic violence’ legitimize a social evil. That is, radical environmentalists have a moral imperative ‘don’t damage the environment’ which their worldview places in the realm of right and wrong – a realm which everyone possesses but which few acknowledge in debates.

The emphasis on empathy and the centrality of worldviews is important for a number of topics in the subject. For example, the policies of various political groups, such as those Neo-Marxists who oppose globalization, are best understood by considering ‘where they are coming from’ – i.e. their worldview. My lectures on immigration show who gains from free labour movements using mainstream analysis. However, it also pinpoints a possible inconsistency between advocating the free movements of goods (i.e. free trade) without simultaneously advocating the free movement of people. On this point, mainstream economics, at least as it is currently practiced, is an inconsistent worldview.

### 4. EVALUATION

Three types of outcome indicate that the approach to teaching international and development economics outlined above has had a positive impact on students and their learning. The first comes from

\(^{10}\) See the appendix for additional details.
student survey feedback on the teaching and learning experiences in this class. Table 1 indicates that students have consistently rated this class highly against a range of criteria over a five year period. This table indicates that feedback scores for the five major summary questions in the UTS Student Feedback Survey were consistently above 4.0 on a five point scale for the 5 year period from 2005 to 2009. The faculty average for these scores was around 3.9.

Table 1: Student Feedback Results for 5 Years

<table>
<thead>
<tr>
<th>Feature of Teaching</th>
<th>2005</th>
<th>2006</th>
<th>2007</th>
<th>2008</th>
<th>2009</th>
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<tbody>
<tr>
<td>Interesting learning experiences</td>
<td>4.1</td>
<td>4.2</td>
<td>4.1</td>
<td>4.4</td>
<td>4.2</td>
</tr>
<tr>
<td>Lecturer prepared/organized</td>
<td>4.5</td>
<td>4.6</td>
<td>4.4</td>
<td>4.6</td>
<td>4.5</td>
</tr>
<tr>
<td>Lecturer is able to explain</td>
<td>4.2</td>
<td>4.5</td>
<td>4.4</td>
<td>4.4</td>
<td>4.4</td>
</tr>
<tr>
<td>Overall satisfied with lecturer</td>
<td>4.3</td>
<td>4.5</td>
<td>4.3</td>
<td>4.5</td>
<td>4.5</td>
</tr>
<tr>
<td>Overall good subject</td>
<td>4.1</td>
<td>4.2</td>
<td>4.1</td>
<td>4.4</td>
<td>4.1</td>
</tr>
</tbody>
</table>

Average student scores on Likert Scale: 1 = Strongly Disagree; 5 = Strongly Agree.

The second type of outcome that indicates the positive impact of the teaching approach on student learning is that a number of students in the subject claimed that their attitude to poverty had changed as a result of their experiences in the subject. Some students even indicated that it had made them want to become personally involved in solutions to the problem of poverty. The following responses to open ended questions on student surveys from the class are examples of this outcome:

‘I feel like the [i.e. my] attitude towards seriousness of poverty in the world has been changing through doing this assignment….It certainly was a good experience!’

‘I used to see the world as an unequal world - I was a pro-inequality person. However, after this experience, I have started seeing things in a different light. I have realized it is not that they are unmotivated or lazy. They simply have no energy to do so in the state of hunger, and all they could see is a grey patch painting across this sundial of life.’

‘I knew in the back of my head that the situation was optional and temporary. For the developing world, there is no such ‘option’. I began to consider how it would feel if that reassurance was absent, and the situation was indefinite. I felt empty. At that point I realized that many people in the developing world were deprived of much more than food, cars and education; they were deprived of hope.’
‘Before the project I was aware of the problem of poverty in developing countries, but through the project I developed a better understanding for these people…. I think I can hear them now and want to get active soon.’

The third type of outcome has been improved student learning of mainstream theory. While I am keen to reveal the limits of mainstream theory in this class, I also want my students to appreciate its insights. It is therefore gratifying to see their understanding of pivotal economic concepts such as opportunity cost and the impact of poverty on ‘capabilities’ being developed by these assignments. The following responses to open-ended survey questions show the links made by students themselves between these exercises and core concepts in the subject area:

‘..having a cap on total expenditure created an environment based on opportunity cost. Often, in choosing one alternative, another had to be forgone – the law of opportunity cost. ... The manner in which we approached the experiment and the reactions of those involved [in the group assignment] indicate that certain economic principles may be incorporated in the issue of global poverty and starvation. The economic principle of unlimited wants and scarcity of resources was brought up in the experiment as was the law of opportunity cost.’

‘I was, however, able to gain insight into the concept of poverty going beyond merely material issues, with the combination of the hunger strike and limited budget impacting severely on my capabilities including productivity to learn and leading to in many cases, social exclusion due to my inability to partake in usual activities with friends.’

5. CONCLUSION
I have taught International Economics for the last six years and have always included the week of deprivation as a prerequisite to students writing their essay. Feedback has been unequivocally positive, and I have never had a student object to the task. Students have also indicated to me that the experience of deprivation was transformational, and would stay in their memories.

‘I would like to take this chance to thank you for coming up with such an interesting topic for me to work on … I will carry this experience with me, wherever I go.’

\[11\] The notion of capabilities is due to Nobel Laureate Amartya Sen.
Using teaching activities that bring emotion and human values into contact with theoretical analysis is a potent method of deepening student engagement with, and understanding of, course material. It also improves critical thinking skills. Although the activities were developed in an International Economics course, they are clearly transferable to courses dealing with Development or Distributional issues.

REFERENCES

APPENDIX: MORE DETAILS ON TEACHING ACTIVITIES
The materials in the appendix are virtually identical to the UTS subject guide, with only minor editorial changes.

A1: Deprivation Exercise
Students were given a choice of two topics in order to complete this aspect of the assessment structure. Each is outlined in turn.

Topic 1 – Global Poverty
One of the key issues in the world today is the presence of severe poverty alongside affluence. This topic is designed to give you some insight into poverty, and to reflect on related issues. The topic has five components:

(a) Live as cheaply as you can for one week. Keep a dated record of all your expenditures and add them up over the week. You must also impute a cost for items which you already own as follows: for clothing, count each item of clothing you put on during the week as
worth $1 (e.g. $2 for changing a pair of socks); for being in a car, count the cost of petrol (using $1 per litre of petrol); for tea, coffee, alcohol and confectionery, count $1 per serve. Accommodation is specifically excluded – I do not want students sleeping on the street or exposing themselves to any risks!

(b) Undertake the World Vision 40 hour famine (officially, it runs in August, but you can do it unofficially any time). If you feel so inclined, you may raise money for this NGO, but there is no requirement to do so. Any student who has medical concerns about a 40 hour fast (i.e. fluid, but no food) should do Topic 2. Any students who undertake the fast, but then suffer any serious symptoms should immediately eat. You should not take pain killers or undertake any medical interventions to complete the fast. I will not deduct any marks for students who start the fast, and then find they cannot complete it.

(c) Write an essay on the impact of poverty on people in the developing world. Economic Development by Michael Todaro is a useful starting point. Outline the pros and cons of current policy initiatives to reduce world poverty (excluding debt forgiveness, which is the topic of Topic 2), based on any reading or internet resources you can find. The World Bank, IMF, and The Economist magazine are all useful resources.

One of the key determinants of your mark will be your coverage of literature. On that note, it is not acceptable to use websites without acknowledged authors, such as Wikipedia, as official references. Only scholarly references should be consulted.

(d) The goal of this part of the assignment is to reflect on the experience of poverty and hunger. Toward the end of your week of deprivation, or soon afterward, answer the following reflective questions:

1. What is the total $ amount you spent during the week?
2. On a scale of 1 to 5, with 1 being ‘not at all surprised’ and 5 being ‘extremely surprised’, record how surprised you were with the difficulty of the experience.
3. Which item did you find the hardest to give up? Why?
4. Which item did you find the easiest to give up? Why?
5. Describe your emotional state at the beginning, middle and end of your time of deprivation.
6. Was your ambition or ability to undertake difficult tasks affected during this experience?
7. Has your attitude towards people in underdeveloped countries changed? If so, why? If not, why not?
8. Reflecting on your experience, do you think a definition of poverty that focuses on ‘necessities’ (things that are absolutely essential such as food, clothing and shelter) is valuable? Why?
9. What other things would you like to include in a measure of your poverty over the week of deprivation and the 40 hour famine?
10. How did you feel about other people over the week of deprivation and the 40 hour famine? Did you resent them?
11. Do you think distribution (the relative wealth of people in society) should matter in a definition of poverty? Why or why not?
12. Compare and contrast your reactions to the deprivation of food as against the deprivation of other items. Include in your answer how your ability to do productive work was affected by each.
13. Any other comments?

(e) Complete the following Worldview Survey:

1. What, if any, objections might you have to using markets to organize all production and consumption in society?
2. Are you suspicious of multinational corporations? Why or why not?
3. Who is responsible for poverty?
4. Do you think that prostitution (with adult, consenting prostitutes) in the developing world ought to be discouraged, tolerated or honoured as a valid profession provided that the women involved can be protected?
5. Do you adhere to any religion? In your view, should religion influence one’s thinking and action on economic policy?
6. If you had to pick three distinctive values to describe Western culture as it is now, what would you choose?

**Topic 2 – Debt Forgiveness**

One of the major forms of international aid at present is debt forgiveness for very poor countries (the so called Highly Indebted Poor Countries or HIPC). Since forgiveness is a form of aid, most of the issues associated with aid are relevant in assessing debt forgiveness. This topic has five components.

(a) Live as cheaply as you can for one week . . . [same as Topic 1].
(b) Consider the problem of responding to people who live on the street when they ask you for money. Decide what you think the best response is, and then answer the questions below in point (d).
(c) Write an essay assessing the success or otherwise of the HIPC initiative. [Similar guidelines to Topic 1.]
(d) The goal of this part of the assignment is to reflect on the experience of poverty and hunger. Toward the end of your week of deprivation, or soon afterward, answer the following reflective questions. Questions 1-7 were identical to those for Topic 1 and the following were appended:

8. Do you give money to people on the street who ask for it? Why or why not?
9. Do you think that a street person ought to promise what they will spend the money on? Why or why not?
10. What are some difficult issues that street people face?
11. Describe the pros and cons of a ‘policy’ of offering to buy them what they said they needed as an alternative to giving money.
12. All things considered, what is the best ‘policy response’ when someone asks you for money on the street?
13. Any other comments?

(e) Complete the following Worldview Survey [same as Topic 1].

A2: Extract from Tutorial “Rights to Pollute and Rights to Domestic Violence”

During the tutorial, I show a brief excerpt from a contemporary movie ‘Amazing Grace’ about the campaign to abolish the slave trade in the 17th and 18th Centuries. The main character, William Wilberforce, proposes a bill in the English Parliament to abolish the slave trade. In response, the opposition mounts a powerful consequentialist argument. The script is as follows:

(Wilberforce stands)

Wilberforce: It is with a heavy heart that I bring to the attention of this house a trade that degrades men to the level of brutes, and insults the highest quality of our common nature. (pauses). I am speaking of the slave trade. (yelling, booing, shouting, waving etc.). I know that many of my honourable friends have interests in the Indies. Others have investments in plantations in . . . And I believe them to be men of humanity. I believe you all to be men of humanity. And the wretchedness of any one . . . (Wilberforce is drowned out by the noise, shouting etc. Opposition Member stands up).

Speaker: Order! Order!!!!
Lord Tartelin: I can hardly believe my ears!

Gallery: We can hardly believe your mouth! (Laughter).

Lord Tartelin: It seems my young friend opposite has a long term strategy to destroy the very nation that spawned him. (Wilberforce sits). When I was in Virginia, losing my fingers in battle with the Americans, he was busy appeasing them! (Cheers and Yelling). He would have us hand over the riches of the Indies to the bloody French! (Noise, Shouting). If we didn’t have slaves, then we wouldn’t have any plantations. And with no plantations, how would we fill the coffers of the King? And does my honorable friend really believe that if we left off the trade the French wouldn’t immediately step into our place and reap the rewards?

In the discussion afterwards, we talk about child labour in the third world. If one is only concerned about consequences, it is easy to make a case for allowing, or encouraging, it. Similarly, if the social setting is of a certain kind, child prostitution could be justified in a similar manner.
A SURVEY OF AS-AD MODELS FOR TEACHING UNDERGRADUATES AT INTERMEDIATE LEVEL*

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ABSTRACT

The Aggregate Supply-Aggregate Demand (AS-AD) model has been an important part of undergraduate teaching in economics for many years. It has, however, been the subject of recent criticism and new frameworks have been suggested to replace it. Given this antagonism, it seems a useful time to reflect on the AS-AD model’s suitability for teaching intermediate macroeconomics. A preliminary step in this process would be to provide a careful survey of AS-AD models used at this level. This paper surveys four common versions of the AS-AD model used in intermediate macroeconomics texts, considers the structure of these models, and carefully analyses their adjustment dynamics for negative demand and supply shocks. It argues that incorporating more than one of the approaches considered into intermediate classes would provide students with a better understanding of the state of economics and would enhance their critical skills by requiring them to understand the similarities and differences between the different approaches.

Keywords: Aggregate demand, aggregate supply, adjustment dynamics, teaching.

JEL classifications: A20, A22, E37

1. INTRODUCTION

The Aggregate Supply-Aggregate Demand (AS-AD) model has now been an important part of undergraduate economics teaching for many years. This has been true at both the principles and intermediate levels, and the model is included in the coverage of most textbooks.

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But the *AS-AD* model has also been the subject of strong criticism, with one prominent economist suggesting that it should cease to be used as a tool for teaching undergraduates at any level (Barro, 1994, p.1; see also Fields & Hart, 1990; Geithman, 1994; and Colander, 1995). Charges against the model include its inconsistent treatment of aggregate demand, its poor specification of adjustment dynamics, its lack of corroboration with empirical observation, and a potential to impede the development of students’ critical skills. New frameworks to replace the *AS-AD* model have also been suggested that substitute the rate of inflation for the price level, and a focus on interest rates rather than the money supply in the conduct of monetary policy (see Taylor, 2000; and Romer, 2000).

Given this antagonism to the *AS-AD* framework, it seems a good time to re-evaluate its usefulness as a tool for teaching intermediate macroeconomics. Intermediate macro provides an important platform for further study in economics and the present authors have been teaching at this level for a number of years. While we intend to undertake such a re-evaluation in a later paper, we suggest that a worthwhile preliminary task would be to provide a survey of *AS-AD* models currently used in intermediate textbooks. Such a survey would provide both detailed background for a careful re-evaluation of the framework, and a useful resource for macroeconomics teachers since textbooks tend to take only one of the possible approaches available, and careful comparisons of these approaches are relatively rare.

The objective of this paper is thus to survey the range of *AS-AD* models available in intermediate textbooks, to reflect on the workings of these models, and to examine how they differ from each other. The paper is structured as follows. Section 2 examines the construction of the aggregate demand curve as presented in a number of well known textbooks. Sections 3 to 6 then outline the key approaches to aggregate supply in these texts with particular attention to adjustment dynamics following two important types of macroeconomic shock: a negative demand shock and a negative supply shock. Section 7 provides some reflection on and comparisons of the *AS-AD* models surveyed, and Section 8 provides some concluding comments.

### 2. THE AGGREGATE DEMAND CURVE

The *AD* curve represents the relationship between the average price level of goods and services and the total demand for these goods and
services throughout the economy. In a number of books that the present authors have set as either primary or supplementary texts in their intermediate macroeconomics teaching, the main channel through which the price level affects aggregate demand involves changes to the real money supply. These changes in turn alter interest rates and cause changes in the level of investment spending, and thus in output and employment. This treatment is often explicated using a simple Keynesian aggregate expenditure or IS/LM model so that the impact of variations in interest rates entails an expanded effect on output via the standard Keynesian multiplier (Glahe, 1977, pp.202-203; Mankiw, 2003, p.322; Blanchard & Sheen, 2004, p.146; Dornbusch et al., 2006, p.111). The result is a negative relationship between aggregate demand and the average price of goods and services.

This approach may be articulated in terms of equations (1) to (3) below (see Glahe, 1977, p.204; and Dornbusch et al., 2006, p.116 ff):

\[ Y = AD = [\bar{C} + c(1-t)Y] + [\bar{I} - bi] + \bar{G} \]  
(1)
\[ Y = \alpha \bar{A} - \alpha bi \]  
(2)
\[ M/P = kY - hi \]  
(3)

In equation (1), output, \( Y \), adjusts to aggregate demand, \( AD \), according to the standard Keynesian principle, and \( AD \) is comprised of consumption spending (the first item in square brackets), investment spending (the second item in square brackets) and autonomous government spending, \( \bar{G} \). Consumption spending is itself made up of an autonomous component, \( \bar{C} \), and an induced component, \( c(1-t)Y \), where \( c \) is the marginal propensity to consume and \( t \) is the tax rate. Investment spending is also comprised of two parts: an autonomous part, \( \bar{I} \), and an induced part that depends on the interest rate, \( i \), where \( b \) is the interest-sensitivity of investment spending. This expression can be simplified and rearranged to obtain the IS relation in equation (2) where \( \alpha = 1/[1 - c(1-t)] \) and \( \bar{A} = \bar{C} + \bar{I} + \bar{G} \). Equation (2) thus specifies the level of output at which the goods market is in equilibrium in the sense that aggregate demand and aggregate supply are equal with no tendency to change.

In equation (3), which constitutes the LM curve, the interest rate is determined by equilibrium between the real money supply (\( M/P \)) and
money demand which depends on a transactions component, $kY$, and a component that depends on the interest rate, $hi$. Parameter $k$ is the income-sensitivity of money demand and $h$ is the interest-sensitivity of money demand.

By solving equation (3) for the interest rate, substituting into (2) and rearranging, we may obtain the following expression for the $AD$ curve:

$$Y = \frac{ahA}{abh + h} + \frac{ab}{abh + h} \cdot \frac{M}{P} \quad (4)$$

This expression specifies an inverse relation between the level of output at which the goods market is in equilibrium and the average price level and may thus be drawn as a downward sloping curve in price-output space. The variable $(Y)$ on the horizontal axis of this curve is frequently referred to as the level of “aggregate demand” (e.g. Glahe, 1977, p.205). While this is technically correct since output is equal to aggregate demand at all points along the aggregate demand curve, it must be remembered that the variable on the horizontal axis is actually the level of output, incorporating a set of supply responses from firms to changes in aggregate demand summarised by the Keynesian multiplier. The incorporation of these supply responses into the structure of the $AD$ curve has been the focal point of one criticism of the $AS-AD$ framework and we intend to consider this criticism in some detail in a later paper. For now, we simply note this feature of the $AD$ curve and will be careful to think of values on the horizontal axis of the curve as levels of output at which aggregate demand is consistent with aggregate supply decisions as they are induced by aggregate demand. This contrasts with the value of $Y$ on the horizontal axis of the $AS$ curve which is based on supply decisions independent of aggregate demand. Referring to the variable on the horizontal axis in this way will make discussion of disequilibrium adjustment later in the paper somewhat cumbersome but it will enhance the precision of this discussion.

Colander (1995, p.171) identifies three channels by which variations in the average price level may affect aggregate demand or output in addition to the interest rate channel identified above which he labels the $Keynes$ effect (cf. Glahe, 1977, p.204). These additional channels are: the international price level channel, operating through the real exchange rate and changes to net exports; a wealth or $Pigou$
effect operating though the impact of changes in the price level on the real value of wealth and a resulting change to consumption spending; and an intertemporal consumption effect according to which a price fall in the face of unchanged expectations of the future price level leads to variations in current spending and thus output.

Mankiw (2003, p.242) introduces his AD curve earlier than his treatment of the IS/LM model using the equation of exchange, $MV=PY$. He assumes constant velocity of circulation ($V$) and money supply, so that increases in $P$ imply reductions in $Y$. The latter he interprets as a fall in aggregate demand so that the standard shape of the aggregate demand curve is obtained. Blanchard & Sheen (2004, pp.148-149) also take a different approach to that outlined above where interest rates are determined not by a money market but by the central bank in response to changes in the price level. As the price level increases, the central bank increases the rate of interest, and this has the usual, negative effect on investment spending thus producing an aggregate demand curve with the standard shape.

There is in general, however, relative similarity in the way aggregate demand is handled by intermediate texts. The treatment of aggregate supply shows a much greater degree of variation and we consider the range of approaches taken in the following sections.

3. THE BENCHMARK NEOCLASSICAL AGGREGATE SUPPLY MODEL

Most texts distinguish between the long run aggregate supply curve, which is vertical at potential or full employment output and to which the economy gravitates with the passage of sufficient time, and the short run aggregate supply curve which is typically characterised by a positive relation between the aggregate price level and output. Since the long run curve defines the position to which the economy eventually returns and around which it fluctuates in the short run, it functions as a benchmark against which the short run relation must be understood and we therefore give it careful attention in this section.

The structure of the long run aggregate supply curve is most thoroughly addressed by Glahe (1977, pp.13-25), the earliest of the texts considered. His derivation of this curve is outlined in Figure 1, where the curve appears in panel (d) and, as suggested above, is vertical in price-output space at the level of potential output, $Y^*$. Potential output itself is determined jointly from the labour market in
panel (a) and a standard aggregate production function in panel (b) where the amount of capital is held constant. Glahe carefully derives the supply curve for labour, $N^S$, in panel (a), from the work-leisure choice facing workers given the real wage, and the labour demand curve, $N^D$, from the firm’s profit maximising choice of labour inputs. He thus provides detailed microfoundations for the labour market equilibrium in panel (a) and hence for the level of full employment, $N^*$. Substitution of $N^*$ into the production function with constant capital gives full employment or potential output, $Y^*$, from panel (b).

In this long run benchmark framework, firms always supply $Y^*$ because the real cost of labour, the real wage, $w$, is constant at its equilibrium value, $w^*$, and prices and wages are perfectly flexible. Given equilibrium in the labour market and its associated real wage,
the money wage, for any given level of this wage, the definition of the real wage implies an inverse relation between the real wage and the aggregate price level. A series of such relations, corresponding to various levels of the money wage, is shown in panel (c) of Figure 1. If the money wage is $W_1$, the equilibrium real wage, $w^*$, translates into a price level of $P_1$. Thus the price-output combination $(P_1,Y^*)$ constitutes one point, $A$, on the long run aggregate supply curve in panel (d) when the money wage is $W_1$ in panel (c). An increase in the money wage to $W_2$ requires firms to increase the price level to $P_2$ in order to maintain the equilibrium real wage, $w^*$, and continue supplying $Y^*$. The price-output combination $(P_2,Y^*)$ thus constitutes a second point, $B$, on the long run aggregate supply curve in panel (d) when the money wage is $W_2$, and so on.

When money wages or prices are not perfectly flexible, however, the aggregate supply curve will be upward sloping. This is generally perceived to be a reasonable assumption in the short run but the logic of the resulting upward sloping relation depends on whether it is prices or wages that are assumed to be inflexible or whether imperfect information forces expectations to play an important role in the behaviour of firms and workers. Mankiw (2003, p.348ff) thus identifies three prominent approaches that may be taken to short run aggregate supply: the sticky wage model; the imperfect information model; and the sticky price model. We consider each of these approaches in turn.

4. THE STICKY WAGE AGGREGATE SUPPLY MODEL

This model was originally characterised as the “downwardly rigid money wages” model and Glahe (1977, pp.25-29), once again, provides an early treatment as a variant of the benchmark framework outlined above. This model adds to the long run framework the assumption that workers resist downward revisions to money wages. If variations in demand lead firms to reduce the price level, this increases the real wage firms face, and their demand for labour falls. If we assume that the price level is initially $P_1$ in panel (d) of Figure 1, a reduction of the price level to $P_3$ in panel (d) would generate a higher real wage of $w_3$, in panel (c) given that the money wage of $W_1$ cannot be reduced. This higher real wage would cause firms to reduce their demand for labour to $N_3$ in panel (a) and to produce output of
only \( Y_3 \) when this new level of employment is substituted into the production function in panel (b). Thus a positive relation emerges between the price level and output for prices below the current price level. For price increases above the current price level, the lower real wage implied by such higher prices would lead to excess demand for labour as before and money wages would rise. The aggregate supply curve would then continue to be vertical at \( Y^* \) for prices in this range.

Glahe regards the downwardly rigid money wage AS curve with an upward sloping portion for prices below \( P_1 \) and a vertical portion for prices above \( P_1 \) as an alternative long run structure to the purely vertical curve presented in Figure 1. Development of the New Keynesian tradition, however, provided a comprehensive theory of nominal rigidities (see, for example, Taylor, 1979) that supported viewing wages as sticky in both directions, but only in the short run. Mankiw (2003, pp.349-351) provides a treatment of aggregate supply along these lines. In terms of Figure 1, assume that the money wage is fixed at \( W_1 \) and is sticky in both directions. We have already explained the upward sloping portion of aggregate supply for prices below the current price \( P_1 \) in terms of Glahe’s analysis, and a similar argument applies for prices above this level. If the price level rises to \( P_2 \), for example, firms face a real wage of \( w_2 \) in panel (c) and demand more labour at \( N_2 \) in panel (a). Mankiw (2003, p.350) assumes that employment is determined by labour demand which then allows production to expand via panel (b) to \( Y_2 \). This approach is somewhat problematic because labour supply at a real wage of \( w_2 \) is smaller than labour demand so that demand is unlikely to be satisfied on first consideration. We return to this issue at the end of this section but accepting Mankiw’s approach for the moment implies that the upward sloping section of the aggregate supply curve continues beyond \( Y^* \) so that the total short run aggregate supply function is now given by both the solid and dashed portions of the upward sloping \( AS_{SR} \) curve in panel (d).

This approach can be expressed mathematically in terms of equations (5) to (7) below. Equation (5) is simply the definition of the real wage, \( w \), in terms of a fixed money wage, \( W \), and the aggregate price level, \( P \). Equation (6) is the labour demand function, \( N^D \), which depends negatively on the real wage. Equation (7) is an aggregate production function according to which output, \( Y \), depends positively on the amount of employment, \( N \), and the stock of capital, \( K \), which
we assume to be fixed in this analysis.

\[ w = \frac{\bar{W}}{P} \] \hspace{1cm} (5)

\[ N^D = f(w) \quad dN^D/dw < 0 \] \hspace{1cm} (6)

\[ Y = F(N, \bar{K}) \quad \partial F/\partial N > 0 \] \hspace{1cm} (7)

We first rearrange equation (5) to express the price level in terms of the fixed money wage divided by the real wage, and we invert equations (6) and (7) to express the real wage as a function of labour demanded, and employment as a function of output. We then substitute (7) into (6), and (6) into (5) to obtain:

\[ P = \frac{1}{f^{-1}[F^{-1}(Y)]} \cdot \bar{W} \]

We may, however, write \( f^{-1}[F^{-1}(Y)] \) as \( g(Y) \) for simplicity, which gives:

\[ P = \frac{1}{g(Y)} \cdot \bar{W} \] \hspace{1cm} (8)

Since \( g(Y) \) is decreasing in \( Y \), \( 1/g(Y) \) will be increasing in \( Y \). Equation (8) then represents the aggregate supply curve when money wages are fixed. It slopes upwards in price-output space as indicated in panel (d) of Figure 1 and its vertical location depends on the value of the fixed money wage.

Let us now consider the model’s adjustment dynamics when the economy experiences negative demand and supply shocks. The negative demand shock case is shown in Figure 2. Assume that aggregate demand is given initially by \( AD_1 \) in panel (d) and that the economy is at point \( A \) with price and output at \( P_1 \) and \( Y^* \) respectively. Assume also that a negative demand shock shifts \( AD_1 \) to \( AD_2 \). At the existing price level, firms continue to supply \( Y^* \) but the level of output at which aggregate demand is consistent with induced supply decisions is much less at \( Y'_1 \) (recall discussion in Section 2 regarding the variable on the horizontal axis of the \( AD \) curve).
While Glahe suggests that the aggregate price level will fall in the face of this demand shock due to the emergence of “excess aggregate supply”, this characterisation is somewhat problematic at the aggregate level. The behaviour of the macroeconomy cannot simply be treated as a single large market that behaves according to standard microeconomic principles but must be governed by equations (5) to (8) which outline the behaviour of the macro system. Unfortunately these equations contain no description of disequilibrium behaviour and we must thus hypothesise such behaviour, treating any resulting adjustment dynamics as essentially implicit to the formal model.

One possibility here is that firms respond to the inventory build-up that is likely to occur when planned output given by the aggregate supply curve is larger than the level of output consistent with
aggregate demand, by considering a reduction in output. Such a reduction would, however, suggest a lower aggregate price level by equation (8). The lower price level, with a fixed money wage of $W_1$ in panel (c) of Figure 2, would raise the real wage from $w^*$ to $w_2$. Less labour would therefore be demanded, and less output produced. At point $B$ in panel (d), with a price level of $P_2$, the level of output at which aggregate demand would be consistent with supply decisions (‘aggregate demand’ in Glahe’s parlance) and the level of output given by the aggregate supply curve, would be equal, and this would constitute a short-run macroeconomic equilibrium.

However, with a real wage of $w_2$, there would be excess supply of $(N_2 - N_3)$ in the labour market in panel (a). This would eventually drive down the money wage, shifting the money wage curve in panel (c) from $W_1$ to $W_2$ and reducing the real wage toward $w^*$. The reduction in the money wage curve would shift $AS_{SR}$ in panel (d) rightwards to $AS_{SR2}$, prices would fall further, and aggregate demand would expand along $AD_2$ until output was back to potential at a new long-run equilibrium at point $C$ with a price level of $P_3$. In the end, all money prices would be permanently lower but output and employment would return to their full employment levels. The negative demand shock would thus cause a recession as the economy moved from point $A$ to point $B$ in panel (d) with output and employment both falling and real wages rising. But as money wages adjust, the real wage would fall again, and output and employment would then recover as the economy moved to point $C$. Real wages would thus behave counter-cyclically in a negative demand shock according to the sticky wage $AS-AD$ model.

Figure 3 shows the implicit dynamics for a negative supply shock. Assume that the production function is initially given by $Y = F_1(K, N)$ in panel (b) with long run and short run aggregate supply curves, $AS_{LR1}$ and $AS_{SR1}$ respectively in panel (d). With aggregate demand at $AD_1$, the economy is initially at point $A$ with price and output at $P_1$ and $Y^*$, respectively. Now assume that a negative supply shock shifts the production function in panel (b) to $Y = F_2(K, N)$, due say to a destruction of capital in an earthquake. This also causes the marginal product of labour to fall, and the labour demand curve thus shifts downwards in panel (a) from $N^{D1}$ to $N^{D2}$. The long and short run aggregate supply curves in panel (d) thus shift to $AS_{LR2}$ and $AS_{SR2}$ respectively, so that at the existing price level, $P_1$, there is once again
a gap between the level of output at which aggregate demand is consistent with supply decisions and the level of planned aggregate supply with firms only prepared to supply $Y_1$ instead of $Y^*_1$. Firms may consider raising output given this gap but they will only be prepared to do this, given the new production function and short run aggregate supply curve, at a higher price. Prices thus begin to rise. As prices rise, firms expand supply and demand contracts. Real wages also fall in panel (c) given a fixed money wage of $W_1$. At point B in panel (d) with prices at $P_2$, we have a new short-run equilibrium at which output is lower ($Y^*_2$) and the real wage is also lower ($w_2$) compared to the initial equilibrium. In contrast to a demand shock, real wages are thus pro-cyclical in this case although this adjustment is not so much part of a cycle but represents a
permanent shift to a new long run equilibrium (assuming no subsequent restoration of the capital stock) which is also represented by point $B$ in panel (d).

The main strength of the sticky wage version of the AS-AD model is that it provides a reasonably thorough treatment of aggregate price level and output determination that draws upon analytical tools sufficiently accessible to intermediate students. Its major limitation, however, is that for prices above the current level, it is not clear how higher output can be produced despite higher demand for labour unless there is also a greater labour supply. This issue was identified earlier in this section. At a real wage of $w_2$ in panel (a) of Figure 1, for example, there is actually a smaller supply of labour rather than a higher one compared to the initial equilibrium. An expanded labour supply to match increased labour demand would require workers to expect a real wage that is much higher than the actual real wage of $w_2$. This may happen if workers observe higher prices and draw from this the inference that money wages will also rise and by a greater proportion than the increase in prices. Friedman (1968) outlined the possibility of such a mismatch in expectations but expectations formation is left completely implicit in this model and this represents a significant weakness of the approach. The imperfect information model, however, deals explicitly with the role of expectations and their formation, and we consider the perspective it provides in the next section.

5. THE IMPERFECT INFORMATION MODEL

Mankiw (2003, p.352) also outlines a model of aggregate supply based on imperfect information. He characterises this model as having a labour market that is free to clear and hence does not suffer from nominal rigidities. But in this model, either firms or workers possess less than perfect information about prices, and this forces them to form price expectations. When these expectations are accurate, the aggregate supply curve is vertical at potential output and the situation is essentially identical to that in the neoclassical benchmark model. But when expectations are inaccurate, the aggregate supply function is upward sloping, and the result is similar to that in the sticky wage model. We consider two, more detailed, versions of this model depending upon whether firms or workers are forced to form price expectations.
Hall & Papell (2005, pp. 408-412), firstly, outline a model based on Lucas (1972, 1973) in which firms are assumed to have imperfect information about the general price level but accurately observe the prices of their own outputs. They must, therefore, form expectations about the general price level and we assume that their own prices are determined by competitive forces at the industry level. Under these circumstances and in a world where prices are constantly rising, the challenge for firms is to correctly interpret increases in the prices of the goods they supply. Such increases could reflect changes in the relative prices of firm outputs or simply increases in the general price level across the economy. The first would signal the potential for increased profits from supplying more output. The second would signal an increase in costs as well as revenues, and no increase in supply would be justified.

We can also represent this approach to aggregate supply mathematically. If $Y_{i,t}$ represents the output of firm $i$ at time $t$, $p_{i,t}$ the price of this output, $Y^*_{i,t}$ the firm’s potential output, $P^e_{i,t}$ its expectation of the general price level, and $h$ a parameter, the firm’s supply curve may be given by equation (9):

$$Y_{i,t} = Y^*_{i,t} + h(p_{i,t} - P^e_{i,t})$$

(9)

When the firm expects no change in the general price level and it observes an increase in the price of its own product, the bracketed term in (9) will increase in value, the firm will interpret this as an increase in the relative price of its own output, and it will expand supply above its normal or potential level. When all prices are perceived as rising by the same amount, there will be no change in this bracketed term and supply will remain the same.

Expectations of the general price level by firm $i$ may be assumed to be formed via a simple adaptive process as outlined in equation (10). The price level expected by each firm in the present period, $P^e_{i,t}$, will be equal to its value in the previous period plus an adjustment upwards if expectations under-predicted the actual price level in the previous period, $P_{t-1}$, and downwards if they over-predicted the actual price level.

$$P^e_{i,t} = P^e_{i,t-1} + j(P_{t-1} - P^e_{i,t-1})$$

(10)
Substitution of (10) into (9) gives:

\[ Y_{i,t} = Y_{i,t}^* + h \cdot p_{i,t} - jh \cdot P_{t-1} - h(1-j) \cdot P_{i,t-1} \]  

(11)

Also assuming that:

\[ Y_t = \sum_{i=1}^{n} Y_{i,t} \quad Y_t^* = \sum_{i=1}^{n} Y_{i,t}^* \quad P_t = \frac{1}{n} \cdot \sum_{i=1}^{n} p_{i,t} \]
and
\[ P_t^e = \frac{1}{n} \cdot \sum_{i=1}^{n} P_{i,t}^e \]

summing (11) over individual firms and rearranging gives:

\[ P_t = \left( \frac{1}{nh} \right) \cdot (Y_t - Y_t^*) + jP_{t-1} + (1-j)P_{t-1}^e \]

Using equation (10), this may be written as:

\[ P_t = P_t^e + \left( \frac{1}{nh} \right) \cdot (Y_t - Y_t^*) \]

(12)

Equation (12) is the Lucas aggregate supply curve and shows that aggregate supply is a positively sloped function of the current price level for given price expectations and assuming these expectations to be incorrect. When expectations are accurate, equation (12) indicates that output for the economy will simply be at its potential level.

Adjustment dynamics in this model may again be considered for the cases of a negative demand shock and a negative supply shock. Taking the first of these, assume that the economy is initially at point A in Figure 4 with prices at \( P_1 \) and output at \( Y^* \). The economy is then hit by a negative shock that moves the \( AD \) curve from \( AD_1 \) to \( AD_2 \). At the original price, the level of output at which aggregate demand is consistent with induced aggregate supply (i.e. “aggregate demand” in Glahe’s terminology) is now only \( Y_1' \) while firms continue to supply \( Y^* \).

Hall & Papell (2005, p.222) explicitly consider the process by which the economy adjusts to such a disequilibrium. Unlike the mechanism proposed for the sticky wage model in the previous section, Hall & Papell argue that firms adjust prices when demand and supply are unequal at the industry level. When “aggregate demand” (in the sense of Glahe) is less than aggregate supply there must be a corresponding excess supply at the industry level somewhere in the economy. This excess supply leads to a reduction in the prices of individual firms’ outputs that pushes the aggregate price level from \( P_1 \) to \( P_2 \). Firms interpret these individual price reductions as reductions in the relative prices of their outputs, and they contract.
production causing a fall in aggregate output to \( Y_2 \). At the same time, the fall in price to \( P_2 \) causes an expansion in aggregate demand and the level of income at which aggregate demand is consistent with aggregate supply from \( Y'_1 \) to \( Y_2 \) and a new short-run equilibrium is established at point \( B \). Over time, however, expectations of the general price level are revised downwards according to equation (10), and the short run AS curve in equation (12) shifts outwards from \( AS_1 \) to \( AS_2 \). This increases supply at the industry level, individual prices fall further, and the aggregate price level falls to \( P_3 \). This fall in price stimulates additional aggregate demand so that at point \( C \) the levels of output at which we have demand-supply consistency and that determined by actual supply decisions are once again equal to potential output.

The dynamics of a negative supply shock are illustrated in Figure 5. If the economy begins at point \( A \) and the value of \( Y* \) suddenly declines from \( Y* _1 \) to \( Y* _2 \) due again to the destruction of capital in an earthquake say, both the long term and short term aggregate supply curves shift to the left. The shift in the short term curve reflects the impact of reduced potential output on the intercept term in equation (12) and is represented by a shift from \( AS_1 \) to \( AS_2 \). At the existing price level of \( P_1 \) each firm thus reduces its supply so that aggregate supply initially falls to just below \( Y* _2 \). Firms thus face excess demand in their individual markets since demand is unchanged at this price level. Individual prices thus rise and the aggregate price
level increases. Firms mistake the general increase in prices for increases in their relative prices, and they expand supply accordingly from just below $Y^*_2$ to $Y_2$. Demand at both the aggregate and industry levels, however, fall from their initial levels at $Y^*_1$ in response to the increase in prices. By the time the aggregate price level reaches $P_2$, demand and supply decisions are consistent and the economy reaches a short run equilibrium. This assumes, however, constant price expectations but these expectations eventually begin to adjust upwards via equation (10). As this happens, the aggregate supply curve shifts further left by (12), prices rise further, and demand is further reduced. A new long run equilibrium is reached at point $C$ with an aggregate price level of $P_3$ and output of $Y^*_2$.

A second detailed model of aggregate supply based on imperfect information is provided by Blanchard and Sheen (2004, pp.124-133; 143-45). In this model, it is workers that form price expectations. We may characterise their approach in terms of equations (13) to (17):

$$W = P^e \cdot f(u) \quad f'(\cdot) < 0$$  \hspace{1cm} (13)

$$P = (1 + \mu) \cdot W$$  \hspace{1cm} (14)

$$u = (N^S - N^D)/N^S$$  \hspace{1cm} (15)

$$Y = aN^D$$  \hspace{1cm} (16)

$$P^e_t = P^e_{t-1} + j(P_{t-1} - P^e_{t-1})$$  \hspace{1cm} (17)
Equation (13) determines the nominal wage rate, $W$. This expression, which Blanchard and Sheen call the wage-setting equation, implies that workers are concerned with real wages and that their real wage demands, consistent with the analysis of Friedman (1968), depend negatively on the rate of unemployment, $u$, but positively on price expectations, $P^e$. Equation (14) outlines the determination of prices by firms as a fixed mark-up, $\mu$, over nominal wage costs. Blanchard and Sheen refer to this as the price-setting equation. Equation (15) is simply the definition of the unemployment rate in terms of the difference between the amount of labour supplied, $N^S$, and demanded, $N^D$, as a proportion of the amount of labour supplied. Equation (16) is a simple linear production function that expresses output as a function of labour employed (assuming that the demand for labour is never larger than that supplied) where $a$ is the labour requirement per unit of output produced. Equation (17) determines the price level expected by workers via the same kind of adaptive expectations mechanism used by firms and outlined in equation (10).

To derive the aggregate supply curve, we express the unemployment rate in equation (15) as:

$$u = 1 - \frac{N^D}{N^S}$$  \hspace{1cm} (18)

and rearrange the production function in (16) to give:

$$N^D = \frac{Y}{a}$$  \hspace{1cm} (19)

Putting (19) into (18) and the resulting version of (18) into (13) gives:

$$W = P^e \cdot f\left[1 - \left(\frac{Y}{aN^S}\right)\right]$$

which we may express as:

$$W = P^e \cdot \varphi\left(\frac{Y}{aN^S}\right)$$

where $\varphi'(Y) > 0$. Further substitution of this expression into (14) gives the worker-based imperfect information aggregate supply curve:

$$P = (1 + \mu) \cdot P^e \cdot \varphi\left(\frac{Y}{aN^S}\right)$$  \hspace{1cm} (20)

This curve slopes upwards since higher output reduces unemployment, lower unemployment improves the bargaining power of workers leading to higher nominal wages (given workers’ price
expectations), and higher nominal wages are passed on in the form of higher prices to maintain the fixed mark-up earned by firms. This is, however, the short run position and it depends on workers’ price expectations being incorrect. In the long run, these expectations will adjust to actual prices, output will gravitate to its potential level and unemployment will adjust to the natural rate. The aggregate supply curve will thus be vertical.

The relationship between the natural rate of unemployment, potential output and the realisation of price expectations in this model may be inferred as follows. Firstly, recall that prices rise when output is above its potential level and vice versa. Secondly, recall the definition of the natural rate of unemployment, that it is the rate experienced when output is at potential. Thirdly, rearrange the wage-setting equation to express workers’ expected real wage in terms of a declining function of the rate of unemployment. This is shown in equation (21). Fourthly, rearrange the price-setting equation to show the actual real wage that results from the prices set by firms. This is shown in equation (22) and indicates that the actual real wage is constant since firms always react to the wage-setting process in order to deliver the fixed mark-up, $\mu$.

While the actual real wage is constant due to the price-setting process employed by firms, workers do not have this information when their wage demands are made and their price expectations must be determined by some process such as that depicted in equation (17).

\[
\frac{W}{P^e} = f(u) \quad (21)
\]

\[
\frac{W}{P} = \frac{1}{1 + \mu} \quad (22)
\]

In general then, workers’ expected real wage and the actual real wage are different unless the unemployment rate equals $u^*$. This may be seen by plotting the wage-setting relation ($WS$) in equation (21) and the price-setting relation ($PS$) in equation (22) which is done in Figure 6.

Fifthly, note that when $u = u^*$, equations (21) and (22) imply $W/P = W/P^e$, which in turn implies that $P^e = P$. But when $u < u^*$, it must be the case that $W/P < W/P^e$ and $P^e < P$. From equation (20) this further implies that $Y > Y^*$. Lastly, when actual prices exceed expected prices, equation (17) indicates that expected prices must be
rising, and actual prices must also be rising via the expression for the aggregate supply curve. Prices must thus be rising when \( u < u^* (Y > Y^*) \) and vice versa. Price stability, therefore, requires unemployment at the natural rate which in turn implies the equality of expected and actual prices, and potential with actual output.

Let us also consider adjustment dynamics for negative demand and supply shocks in this model. Taking the first of these, assume that the economy begins from point \( A \) in Figure 4 and that the \( AD \) curve shifts from \( AD_1 \) to \( AD_2 \). In this model, firms explicitly cut production in response to the fall in aggregate demand, demand for labour falls according to equation (16) and unemployment rises according to equation (15). Money wages then fall by equation (13), as do prices by equation (14). The economy thus moves to point \( B \) and the lower output of \( Y_2 \) is supplied at a lower price level than at \( A \). Output thus falls below \( Y^* \). With \( P^e > P \) at point \( B \), equation (17) indicates that workers revise their price expectations downwards, since the bracketed term in this expression is negative, leading to a fall in the value of \( P^e \). Given equation (20), this leads to a downwards shift in the aggregate supply curve from \( AS_1 \) to \( AS_2 \). Reduced price expectations lead to further nominal wage reductions by equation (13) and price reductions by equation (14). As prices fall further, aggregate demand is stimulated, and output expands back to \( Y^* \) at point \( C \).
also corresponds to unemployment falling back to $u^*$. While the actual real wage is always constant in this model, the real wage perceived by workers behaves pro-cyclically. In the movement from point $A$ to point $B$, money wages initially fall in response to higher unemployment while expected prices remain initially unchanged. Lower real wages thus coincide with lower output and employment. As the economy moves from point $B$ to point $C$, price expectations adjust downwards and the real wage rises again with aggregate demand, output and employment recovering to their full employment levels. Perceived real wages and economic activity therefore, always move in the same direction in this model for demand shocks.

The dynamics of a negative supply shock are illustrated in Figure 5. Assuming the economy begins at point $A$, allow firms to suddenly increase the mark-up from $\mu_1$ to $\mu_2$. This will raise prices via (14) and eventually expected prices via (17). Once expected prices are affected, the short-run aggregate supply curve will shift upwards to $AS_3$ via (20). Aggregate demand will fall due to the increase in prices, resulting in the higher price level of $P_3$ and a lower output of $Y^*_2$. The lower level of output implies higher unemployment but this turns out to be a permanent change rather than a merely transitory one. Figure 7 indicates that the higher mark-up shifts the price-setting curve downwards so that the natural rate increases from $u^*_1$ to $u^*_2$. This higher natural rate signals a reduction in potential output so that the vertical long run aggregate supply curve also shifts left in Figure 5 from $Y^*_1$ to $Y^*_2$. The initially short run equilibrium at point $C$ is thus
also a long run equilibrium. With the real wage in this version of the
imperfect information model given by \(1/(1 + \mu)\), real wages fall at
the same time that output falls from \(Y^*_1\) to \(Y^*_2\) and thus also behave
pro-cyclically in the supply shock case.

Having considered two variants of the imperfect information model
and their adjustment dynamics, we turn now to consider the final AS-
AD model: the sticky price model.

6. THE STICKY PRICE MODEL

This model is outlined by Mankiw (2003, pp.353-5) and reflects the
contribution of such authors as Rotemberg (1982). The approach
stresses costly price adjustment which causes some firms to set and
leave prices for given variations in costs and demand. The argument
may be framed in terms of equation (23) where Mankiw makes the
assumption that firms focus their attention on price-setting and adjust
output to meet demand.

\[
p_i = P + \lambda(Y_i - Y_i^*)
\]  

According to this expression, firms’ individual prices, \(p_i\), are set on the
basis of costs as reflected in the aggregate price level, \(P\), and the
extent of demand for their product relative to their potential output,
\(Y_i - Y_i^*\). As firm demand and output rise above potential, marginal
cost increases and this is reflected in the prices firms need to charge to
maintain their profits. Mankiw uses aggregate actual and potential
output in his version of equation (23) despite the focus being at the
firm level, but we show below how equation (23) leads to the same
aggregate supply curve obtained by Mankiw.

Mankiw also assumes two types of firm: those that set price
continuously on the basis of equation (23); and those that regard
changing prices as costly so that they prefer to set price on the basis of
their expectation of the variables in equation (23) and leave it until the
next review. If \(P^e_i\) represents firm \(i\)'s expectation of the aggregate
price level and we assume that the best estimate of current output (and
thus demand) is, on average, \(Y_i^*\), equation (23) becomes (24) and
“sticky price” firms simply set price equal to \(P^e_i\).

\[
p_i = P^e_i
\]  

Noting again that \(P = \frac{1}{n} \cdot \sum_{i=1}^{n} p_i\) and assuming that the proportions
of sticky price and flexible price firms are \(s\) and \((1-s)\) respectively, the aggregate price level will be given by:

\[
P = s \cdot \left( \frac{1}{n} \sum_{i=1}^{n} P_i^e \right) + (1 - s) \cdot \left( \frac{1}{n} \sum_{i=1}^{n} \left[ P_i + \lambda (Y_i - Y_i^*) \right] \right)
\]

(25)

Which can be rearranged using: \(Y = \sum_{i=1}^{n} Y_i; Y^* = \sum_{i=1}^{n} Y_i^*\); and \(P^e = \frac{1}{n} \sum_{i=1}^{n} P_i^e\) as well as the definition of average prices to give:

\[
P = sP^e + (1 - s) \cdot \left[ P + \left( \frac{\lambda}{n} \right) (Y - Y^*) \right]
\]

or solving explicitly for \(P\):

\[
P = P^e + \frac{a \cdot (1 - s)}{s} \cdot (Y - Y^*)
\]

where \(a = \lambda / n\) and which is the same as the expression obtained by Mankiw (2004, p.355). We will write this expression more compactly as:

\[
P = \left[ P^e - \vartheta \cdot Y^* \right] + \vartheta \cdot Y
\]

(26)

where \(\vartheta = a \cdot (1 - s) / s\). Equation (26) constitutes the sticky price aggregate supply curve. The aggregate price level depends on price expectations as in the incomplete information model and is positively related to the level of output. However, the slope of the curve depends on the proportion of sticky price firms. As \(s\) increases, the aggregate supply curve becomes flatter and the output response from variations in aggregate demand becomes larger. When all firms are sticky price firms and \(s\) is unity, \(\vartheta\) is zero, and the aggregate supply curve is horizontal at \(P^e\). Variations in aggregate demand have no effect on the aggregate price level but a large effect on output; a very “Keynesian” result. When \(s\) is zero, the aggregate supply curve is vertical at \(Y^*\) and any variation in aggregate demand affects only the aggregate price level with no effect on output.

We may again use Figures 4 and 5 to consider the adjustment dynamics for this version of the model. In the case of a negative demand shock, allow the economy to begin in long run equilibrium at point \(A\) in Figure 4. When \(AD\) falls from \(AD_1\) to \(AD_2\), demand for goods also falls at the industry level. Flexible price firms thus reduce their prices due both to the fact that demand for their own product has fallen and because their costs have fallen since other firms have
reduced prices in response to lower demand for their products. Sticky price firms, however, maintain their original price level at \( P^e \). Thus instead of the price level falling from \( P_1 \) to \( P_3 \) (as it would were all firms flexible price firms), the price level only falls to \( P_2 \). Given the new, lower aggregate demand curve, the level of demand at a price of \( P_2 \) is only \( Y_2 \), and given the assumption that firms accommodate demand, this is the level of output supplied. While no explicit formulation of expectations is provided, an adaptive mechanism such as that in equation (17) will lead to a downwards revision of expectations at some point in the future which by (26) will lead to a downwards movement in the \( AS \) curve and in the aggregate price level. Such revisions will continue until the \( AS \) curve is represented by \( AS_2 \) and the economy reaches its new long run equilibrium at point \( C \). A regime of rational expectations will shift the \( AS \) curve to \( AS_2 \) and the new long run equilibrium immediately.

The dynamics of a negative supply shock may be understood in terms of Figure 5. Assume that the economy begins at point \( A \) and that the value of \( Y^* \) declines suddenly from \( Y^*_1 \) to \( Y^*_2 \) due to the destruction of capital, as previously assumed. In this case the \( \theta \cdot Y^* \) term in (26) falls, and the intercept in square brackets rises, shifting the short term aggregate supply curve in Figure 5 from \( AS_1 \) to \( AS_2 \). Flexible-price firms raise their prices to reflect the full effect of their reduced productive capacity. If all firms did this, the \( AS \) curve would shift to \( AS_3 \) and the aggregate price level would rise to \( P_3 \). But sticky price firms do not change their prices in the short run. The aggregate supply curve thus moves only to \( AS_2 \) and the price level rises only to \( P_2 \). At this higher price level, aggregate demand contracts to \( Y_2 \) and supply contracts to accommodate this fall in demand. When firms eventually revise their expectations, the \( P^e \) term in (26) rises, and the \( AS \) curve shifts further to \( AS_3 \). The aggregate price level thus rises to \( P_3 \), demand contracts further to the new level of potential output \( Y^*_2 \), and supply contracts to accommodate this further fall in aggregate demand. The economy is now at its new long run equilibrium at \( C \).

The sticky price model thus produces similar results to the imperfect information model although the precise nature of its dynamics is somewhat different. We turn in the next section to more carefully compare the key features of the various models considered in Sections 3 to 6.
Table 1: Model Characteristics for Negative Demand Shock Case

<table>
<thead>
<tr>
<th>Model</th>
<th>Main Adjustment Mechanism</th>
<th>Expectations</th>
<th>Real Wage Behaviour</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sticky Wage</td>
<td>Real wages fall due to:</td>
<td>No explicit treatment</td>
<td>Counter-cyclical</td>
</tr>
<tr>
<td></td>
<td>• Price response to lower demand;</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Constant money wage.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Firm-based Imperfect Information</td>
<td>Price falls due to lower demand and mistaken firm expectations of lower profits.</td>
<td>Formed by firms</td>
<td>Counter-cyclical</td>
</tr>
<tr>
<td>Worker-based Imperfect Information</td>
<td>Production is reduced due to lower demand, and price falls as wages fall in response to higher unemployment.</td>
<td>Formed by workers</td>
<td>Actual wage - constant Expected wage - pro-cyclical</td>
</tr>
<tr>
<td>Sticky Price</td>
<td>Price fall is limited by price rigidities at firms. Demand does not return to previous level due to higher than equilibrium price and production adjusts to lower demand.</td>
<td>Formed by firms</td>
<td>Pro-cyclical</td>
</tr>
</tbody>
</table>

7. AN OVERVIEW AND COMPARISON OF THE MODELS
The range of models considered in the foregoing sections presents some challenges for both macroeconomics teachers and their students at the intermediate level. For teachers, the main challenge is deciding which of these versions of the AS-AD model to use in their classes. For students, the main challenge is to master the complexity involved in what are relatively abstract analytical frameworks. While we intend to provide a detailed treatment of these issues in future work, a useful first step is to compare the range of models so that their main differences and similarities are evident. We do this for the two dynamic adjustment cases considered: the negative demand shock and the negative supply shock respectively.

Table 1 sets out the main features of the four models for the negative demand shock case. The second column highlights the main mechanism by which each model initially responds to the shock and
then by which it adjusts to a new, long run equilibrium. As would be expected, the economy experiences a reduction in both the aggregate price level and the level of output in all of the models when demand is reduced. In two of the four models (the firm-based imperfect information and sticky price models), the immediate response of the economy to reduced demand is to reduce the aggregate price level. This happens at the industry level where aggregate demand and output are explicitly conceived as the sum of industry demands and outputs. Lower demand means a lower price at this level, and the aggregate price level falls because this is an explicit average of industry level prices. In the sticky wage model, while prices are reduced in response to the fall in aggregate demand, this price reduction is triggered by a consideration of reducing output in response to the fall in demand and it is difficult to disentangle the sequence of the two effects.

The mechanism by which the lower price level affects output then varies across models. In the sticky wage model, lower prices in the face of fixed money wages raises real wages, and firms choose to use less labour in the production process. This translates into lower production. In the firm-based imperfect information model, the lower price level is perceived as a relative price decline for each firm’s output, and production is cut by all firms in response. This could be perceived as an increase in the real wage resulting in similar firm behaviour to that in the sticky wage model. In the sticky price model, while all firms correctly perceive the new long term price level that emerges after the demand shock, some firms delay the downwards adjustment of their prices and this prevents reduced demand from moving back to its full employment level. Output is assumed to accommodate aggregate demand in this model and so it falls in response to the lower level of demand. Thus in the first two of these models, firms can be perceived as optimising on input choice and this generates an output response. This is, however, explicit in the sticky wage model but only implicit in the firm-based imperfect information model. These models are thus essentially neoclassical in their core design features while the sticky price model has a stronger Keynesian flavour with production essentially responding to demand.

In the worker-based imperfect information model, the initial response of firms is not to reduce prices but production. Reduced production then has an impact on prices via higher unemployment and lower growth in money wages. This model thus has an even stronger
Keynesian flavour than the sticky price model.

Expectations play an important role in the three more recent of the four models although the role of expectations is different across these three models and plays the most decisive role in shaping the economy’s short run response in the firm-based imperfect information model.

Real wages only receive explicit treatment in the sticky wage and worker-based imperfect information models being counter-cyclical in the first and nominally pro-cyclical in the second. However implications can be inferred about real wage movements from the other models. Since price falls lead the response in the firm-based imperfect information model ahead of reductions in money wages, real wages may be assumed to rise initially, as output and employment fall. Then as the full response of falling money wages to higher unemployment occurs alongside an additional but smaller downwards adjustment to prices, real wages may be assumed to rise initially, as output and employment expands back to its long run level. Real wages may thus be perceived to behave counter-cyclically in the firm-based imperfect information model. In the sticky price model, no restriction is placed on the adjustment of money wages to lower demand but prices are slow to reflect their full adjustment. Real wages may thus be interpreted as falling initially and then rising when the final adjustment to prices occurs later and the economy reaches its new long run equilibrium. Real wages thus appear to behave pro-cyclically in the sticky price model.

Most of the model characteristics outlined in Table 1 also apply to the negative supply shock case. The main difference is with respect to the behaviour of real wages. In the case of the sticky wage model, the disruption to the production process reduces labour productivity and demand for labour, reducing supply at each value of the aggregate price level. As firms raise prices when the level of output at which aggregate demand and supply are consistent exceeds the planned level of aggregate supply (a kind of positive aggregate demand gap), real wages fall given fixed money wages. Real wages thus move pro-cyclically in this case in contrast to the aggregate demand shock. In the worker-based imperfect information model, real wages also move pro-cyclically although this is hardly surprising given that the supply shock originates with an increase in the firm mark-up.

In the firm-based imperfect information model, real wages could be expected to move pro-cyclically in contrast to their behaviour in the
demand shock case. The fall in capital stock and demand for labour should reduce the equilibrium real wage as in the sticky wage model although this is, of course, purely implicit in this model. The price rises caused by excess demand at the industry level as supply contracts thus systematically reduce real wages until the new long run equilibrium is reached in Figure 5. The same result is produced in the sticky price model.

Thus of the four models considered, real wages behave pro-cyclically for both negative demand and supply shocks only in the firm-based imperfect information. In the sticky wage and sticky price models, real wages behave counter-cyclically for aggregate demand shocks and pro-cyclically for aggregate supply shocks. In the worker-based imperfect information model, real wages are uncorrelated with the cycle for demand shocks (although the real wages workers perceive behave pro-cyclically), and are pro-cyclical for supply shocks.

8. CONCLUDING COMMENTS
This paper has surveyed four common versions of the AS-AD model used in intermediate macroeconomics texts, considering the structure of these models as well as their adjustment dynamics for negative demand and supply shocks. While the diagrams typically used to present these models to students look very similar, their dynamics are very different. This of course reflects the various perspectives that researchers have brought to bear on the question of price and output determination and the behaviour of these variables across the economic cycle. The nature of macroeconomic research is often that only one particular dimension of the economy’s operation is focused upon in any particular contribution, leaving the relationship between contributions to the writers of texts and survey papers. But the writers of texts often have the objective of attempting to tell a coherent story about the overall structure of macroeconomic ideas, and this is often best suited by adopting a single particular perspective.

This tendency gives rise to the problem faced by teachers of deciding which of these perspectives to present to their students. The problem is typically solved by the teacher choosing a text with which they are generally comfortable and then presenting the AS-AD approach adopted in that text. The danger with this approach, however, is that the particular version then presented often takes on
the air of being “the truth” (Siegfried et al., 1991, p.212) which potentially misleads students about the state of macroeconomics and forces the teacher into the difficult position of either defending that particular approach (which they might or might not actually agree with) or explaining why they aren’t discussing other approaches as well.

But the very existence of the variety of approaches to the $AS-AD$ model also suggests a solution to the problem it creates. Presenting *more than one* approach would have two clear advantages. The first is that it would provide students with a better understanding of the state of economics and how the discipline functions. Students would thus not simply adopt as “the truth”, the first framework they encountered but would understand that macroeconomics is an inexact science in which there are different conceptions and dimensions of how the economy functions. Secondly, their critical skills would be more highly developed. They would be confronted with the question of how the different versions of the $AS-AD$ model relate to each other, what the similarities and differences between the models are, and they would need a thorough understanding of exactly how these models function in order to answer these questions. This would have the potential for training better economists who both understand the frameworks they use to examine the economy, and who are more prepared to question those frameworks rather than to blindly accept and apply them.

There are of course challenges posed by adopting this kind of approach to teaching the $AS-AD$ framework. Not the least of these are constraints on the time that can be devoted to this part of the curriculum and how students can be motivated to engage with analytically demanding material. There is also the question of whether the criticism identified in the introduction to this paper is sufficiently serious that the $AS-AD$ model should in fact be dropped from the intermediate syllabus altogether. We leave these questions to future papers but we suggest that the above reflections on the $AS-AD$ model make these questions worthy of careful consideration.

**REFERENCES**


