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ACKNOWLEDGEMENTS

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Welcome to the second 2012 edition of Creative Distraction!

You know the drill. With exams wrapping, Creative Distraction is here to help! it is our aim in each addition to publish interesting and readable articles, essays and reviews submitted by your peers at UQ and in doing so edify your summer break.

In keeping with the first edition this year we have also included another interview with a lecturer from the School of Economics you may not have encountered yet, in addition to some econ-comical material to lighten your day.

A huge thank you to those who contributed to this edition: Associate Professor Valentin Zelenyuk for his interviews; Brendan Markey-Towler and Lawson Ashburner for their contributions; and the School of Economics and the BEL Faculty for their ongoing support.

Thanks must also go to those who submitted articles, it is unfortunate we could not publish more. Please keep an eye out towards the end of semester one next year for your chance to contribute an article to the second edition. You can also get your name in a coveted UQES publication in another way by submitting a course review for the 2013 BEcon Guide: head to our website (uqes.com.au) for the course review link.

Best of luck with your exams and hopefully this will aid you in procrastinating in a mildly relevant way!

Rachael Fitzpatrick and Carl Tessmann
Publications Officers

MEET YOUR LECTURER

Associate Professor Valentin Zelenyuk

Courses taught in 2012:

ECON2300 - Introductory Econometrics

ECON3320 - Statistical Theory for Economists

Recent Publications:

Zelenyuk, V. (2011) "Aggregation of Economic Growth Rates and of its Sources," *European Journal of Operational Research* 212, 190–198.

Park, B., L. Simar and V. Zelenyuk (2008) "Local Likelihood Estimation of Truncated Regression and its Partial Derivatives: Theory and Application" *Journal of Econometrics* 146, pp.185-198.

Question Time

1. If you weren't an economic academic, what would you be?

Hard to say. Maybe a physicist or a chemist, or IT engineer (for artificial intelligence)? Those are fascinating subjects too, but I like economics more (with econometrics and productivity analysis in particular) ...

2. What's your favourite area of study within economics?

My main research area is econometrics with a particular focus on productivity and efficiency analysis. This is mainly because it is about one of the most practical and most important issues in a life of a person, a firm, a country, any entity—to be productive and efficient in this world.

3. A person is at the level 2 entrance of Colin Clark and wants to get to Level 5. Should they take the stairs or the elevator?

It depends. No joke: for example, it depends if the elevator is working or not, how many people are trying to get in there before you, etc. ...

4. Who is the person you'd most like to be stuck in an elevator with?

Never thought about it. I'd rather try to avoid being stuck (in an elevator or elsewhere) and rather meet with that person in a more comfortable environment... our coffee shop on rooftop terrace, for example, is a nice place...

5 What's the most favourable quality in a student and what's the most irritating quality?

Industriousness and honesty would be the most favourable, I think, and, conversely, non-industriousness and dishonesty would be the most irritating.

6. Who would you rather be partnered with in a game of charades: Angela Merkel or Hillary Clinton?

I assume you mean the word guessing game? If so, then both will do — and it would be an honour to talk to them.

7. The cost of the three-year UQ Bachelor of Economics degree for international students starting in 2012 is \$88,800. Is enrolling a rational decision?

It depends. Again, not joking: It depends on the goal (set by preferences) of the person considering it. If the person wants to be an artist, then the answer is “No”, but if the person wants to get solid knowledge in economics that can help this person to get a good job and do a good work as an economist—then the answer is “Yes”, assuming that the person will invest not only this amount but also, and mainly, a lot of efforts for studying at the program.

8. If the Eurozone ends up doing the hokey pokey, who will be out first?

If you mean a break up into pieces, then it is natural that Greece exits the Euro on some kind of probation, gets its currency depreciated, which will make its exports cheap and it will help Greece to ‘export itself out of the crisis’. In my opinion, this should have been done long ago and postponing of this ‘cutting the losses’ step leads to a slow but persistent spreading out of the problem.

9. “Wayne Swan: the world’s best treasurer.” A statement of truth, or the result of imperfect competition?

I am not in a position to identify if something is the ‘truth’ or not, unless it is stated in mathematical language (assuming I could fully understand it). In my opinion, the Australian government in general, and Wayne Swan in particular, is doing a good job overall, and especially when compared to reality and the current situation with majority of other countries. Of course, the main factor of the economic growth of Australia, especially on the background of stagnating developed economies, is related to Australian natural resources



and the existing demand for it, mainly from China. Yet, it takes a good government to make sure this growth is realized and wisely used to the benefit of the entire nation. Surely, there are always some imperfections and problems, whoever is at the government, and it is good that the opposition stays active and ensures the government tries its best. Overall, it appears to me that Australia is wisely balancing the interests of the labour force and of the capital force, which, in my opinion, is the essence of politics. The rest are details. A misbalance between these major economic forces eventually leads to problems, while extreme misbalances can lead to serious problems, such as revolutions, e.g., as we’ve had in 1917 with Russia and 1991 in the USSR. By the way, I think that if the current Australian opposition comes to the power, it will also do similarly well as the current government, with some differences, of course, and somewhat different view on that balance, but similarly well. Yet, it will also be criticized as much. And, it’s only after some years pass that we could more clearly see who was really better.

10. What is the most amusing exam question answer (or assignment) you’ve encountered?

I guess I never encountered truly ‘amusing’ ones that I could remember till today and then tell it to you now. Maybe they still wait for me in the future?... Or, perhaps, I should try to create one for students...

The Philosophy of Justice and

by **Brendan Markey-Towler**

* This essay will appear in a revised form as a Chapter in the author's Honours thesis, available from the UQ library.

The political philosophy of inequality is a hard-fought intellectual battleground with a history stretching back centuries into the debates of antiquity. In Plato¹ we find an explanation of inequality as due to the natural abilities of people, famously related by analogy to the value of precious metals (the philosopher-kings being gold, the middle class silver and the working class bronze). Likewise, Aristotle² claims class inequality is just, provided that the basis of such inequality is in the nature of the persons concerned. In one extreme argument, a slave's employment is justified if their character is naturally that of a slave (and likewise for their master), and it is actually beneficial for them to be a slave rather than a free man.

In current debates over the justness of inequality it seems that a view rather opposite to that of Plato and Aristotle is gaining the upper hand. Certainly the political climate which produced *Ill Fares the Land* (Judt, 2010) would indicate that calls for inequality to be drastically reduced (such as Warren Buffett's oft-quoted indignation at having to pay a lower tax rate than his secretary) will be much better received than dismissive remarks from the political right such as Mitt Romney's infamous utterance that "any concern about inequality is just envy". However, in the prevailing current of the day it may be easy to forget that many of the arguments contain kernels of truth even when advanced by opposing parties.

Perhaps one of the most vivid illustrations of this, once stripped of its rather histrionic tone, is J.R. Lucas' polemic essay *Against Equality*. This essay neatly encapsulates the argument against the simplistic notion of universal egalitarianism advanced by many in Lucas' time, stating flat out that it is impossible to achieve "equality" in the sense of treating like exactly as like. Quite simply, human beings are so diverse in only one of the infinitely many dimensions which constitute their characteristics that it is impossible to say exactly how alike

two people are. The broader argument for equality that "all men are equal because they are all men" is a non sequitur and confused logic which nonetheless conceals a grain of truth. What we are really to be concerned with, Lucas argues, is ensuring that none fall so far below the average as to affect their ability to live adequately, while understanding that our society naturally creates opportunities for individuals to advance themselves relative to others (it is a sign of accomplishment and desirable). Hence the liberty to distinguish oneself by attaining higher income, prestige, and power is necessarily in tension with the desire for equality of some kind. The solution here is effectively to allow equality of liberty and of the right to resources that will allow some degree of socially acceptable life.

Lucas' essay, one could argue, inadvertently summarises centuries of debate from which the philosophical position of Amartya Sen would emerge. It is this "capabilities" approach which I would argue gives us the most just (in the sense of promoting efficient but fair market outcomes) system for analysing questions about inequality, allowing for advancement through choice while providing a socially acceptable standard of living for all.

John Rawls and the minimax criterion

The *Theory of Justice*, John Rawls' (1971) magnum opus was the first truly significant modern statement on distributional justice. Coming from a social contractarian background, Rawls attempted to understand the nature of justice by discovering what an impartial observer would decide were just provisions concerning distribution of resources. This approach had a history stretching right back to Rousseau's theory that human beings will agree to give up some liberty in order to gain security and greater wellbeing (see Rousseau (1762)). But what separated John Rawls from the rest was his method of imposing impartiality. To decide what will be considered a set of just organisational prin-

¹ see Plato's *Republic* pp.112-129

² see Aristotle's *Politics* pp.66-69

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ciples for society “souls” will meet in some space, completely unaware of the roles they are about to take within society, and set down the social contract (Bojer, 2003). From a meticulous analysis of what risk averse individuals would consider in the “original position” Rawls argued that two principles in the social contract would emerge

1. Individuals are to be granted the liberty to pursue their own ends
2. Any inequality must be the result of some office to which any in society can aspire, or this inequality must be of benefit to the least advantaged member of society.

The second of these principles (the “minimax principle”) is the more controversial of the two and often overshadows the first in the public mind. Rawls further suggested that the inequality to which he was referring was not income or wealth inequality as many would define it, but rather a set of “primary goods” which each individual will need in order to function in society (Bojer, 2003). Hence Rawls manages to maintain the Rousseau-style tension and balance between the freedom to choose one’s actions while also providing a safeguard against individuals being unable to function within society. This philosophy also has some considerable bite as it admits the possibility of some absolute level of required resources (more related to poverty studies), as well as the possibility that the “required” resources may in fact depend on what society deems to be a socially acceptable bundle (the phenomenon of how this may evolve beyond the bare necessities was discussed at length in (Veblen, 1899)).

Rawls’ seminal contribution to modern thought would spark half a century (and counting) of argument and thought in the public arena (even making a cameo appearance in the *West Wing*). It would provoke a significant rebuttal from assorted libertarians uneasy about the redistributive and interventionist overtones of the minimax principle. , these debates formed the intellectual discourse that

would ultimately culminate in Amartya Sen’s “capabilities approach” to political/moral philosophy. This would take the two great political ideals and merge them into a nuanced and inherently reasonable theory of distributional justice accounting for the primacy of choice as well the fundamental desire for egalitarianism.

Nozick and the libertarian rebuttal

Provoked by Rawls’ breakthrough, Robert Nozick (1977) countered from the libertarian camp with *Anarchy, State and Utopia*. He held to a more strict reading of John Stuart Mill which emphasised the inherent justice in liberty, the freedom to choose the course of action the individual feels will satisfy their aims without the interference of any outside. Nozick argued that in the pursuit of their aims, justice required that the individual have the right to the fruits of their own labour, free from any coerced redistribution to another individual who would then be receiving commodities without having worked for them (Roemer, 2009).

Naturally, in order to pursue their goals of wellbeing, agents may need a multitude of different commodities. So justice requires that individuals be able to engage in free and voluntary exchange so as to be able to obtain the goods they need but haven’t produced only by exchanging, in effect, their labour. The only time an agent is permitted in Nozick’s philosophy to obtain something that they haven’t “earned” through their own self-interested, though costly activities, is when the resource is unclaimed and claiming the resource will benefit the individual without harming any others (a Pareto improvement).

Certainly this view that justice consists of effort being accordingly rewarded has emotional appeal to many (McCarty, 2009). The appeal of such a view was brilliantly evoked by Ayn Rand’s fable of John Galt and his millionaire friends who flee America rather than see their resources transferred to the great unwashed. So it follows that an accepted political philosophy must permit inequality to be some

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form of reward for the choice to undertake difficult actions.

Amartya Sen and the capabilities approach

Amartya Sen is something of the exception which proves the rule:

“A truth universally acknowledged in the profession was that justice in distribution is not and cannot be the subject of academic research...the societal welfare function is for the politicians to determine and for the economics profession to put into practice” (Bojer 2003, p.1)

Sen, unusual amongst economists of his generation from what is now Bangladesh became a social choice theorist, bringing its rigorous analysis to bear on questions of political and moral philosophy. Over a fifty year period his writings on the philosophy, rationality and economics would coalesce into his masterpiece *The Idea of Justice* (2009). In this he defends the idea that the just aim of policymakers is to give individuals the ability to choose what they as a society would consider a good life.

Sen acknowledges that his greatest intellectual debt is to his teacher John Rawls, though he suggests that the social contract determined in the original position needs extending (Sen, 2009). In particular, Rawls’ minimax criterion calls for the equality of “primary goods” wherever there is no compelling reason why an inequality would not be of benefit to the least advantaged member of society. However, there is an assumption that all individuals will be able to function in society to the same degree if they are all granted the same basket of commodities at minimum. Hence it is in this income space that equality is desirable wherever possible. But what if income means different things to different people? Someone who is disabled will need a greater provision of such primary goods to function in society, but it is not clear how Rawls’ principles will permit such an inequality without redefining “advantage” to mean utility (Sen, 1995).

A welfare economist would typically suggest that the solution is quite simple, that we maximise a social welfare function constructed from the utilities of individuals within society. However, in *On Economic Inequality* (1973) Sen shows a simple example where such an argument would lead to what may be considered a perverse outcome. The utilitarian argument demands that we maximise a social welfare function of the form

$$W(x) = \sum_i \alpha_i u_i(x_i)$$

hence,

$$\max\{W(x)\} \Rightarrow \alpha_i \frac{\partial W}{\partial x_i} = \alpha_j \frac{\partial W}{\partial x_j} \quad \forall i, j$$

However, suppose that while all utility functions are strictly concave, individual k is a “pleasure machine” who can derive more marginal utility per unit of commodity vector x_k than individual l who is a child with low metabolism (perhaps from chronic malnutrition), then

$$\{u'_i(\cdot) > 0, u''_i(\cdot) < 0 \quad \forall i \in (1, N)\} \& u'_k(\cdot) > u'_l(\cdot)$$

$$\Rightarrow \exists \{\alpha_k - \alpha_l < \epsilon\}: \{\alpha_k u'_k(x_k) = \alpha_l u'_l(x_l) \Rightarrow x_k > x_l\}^3$$

So in this situation, utilitarianism demands there be transfers of commodities from the utility poor malnourished child to the utility rich “pleasure machine” in order to maximise welfare, which I would posit may strike many as a perverse outcome. Indeed it is exactly this sort of situation which induced Rawls to write *A Theory of Justice* to replace utilitarianism. So Sen argued in *On Economic Inequality* in favour of the weak equity axiom for policymaking. If

$$u_A(x_A) < u_B(x_B) \text{ and } u'_i(\cdot) > 0, i = [A, B]$$

then there should be transfers of commodities x_B to x_A , which only requires that utility be equal across individuals, not necessarily commodities⁴.

³ Proof : Suppose that $x_i = x_j$, then by strict concavity, $u'_i(\bar{x}) < u'_k(\bar{x})$, and again by strict concavity $u'_i(\bar{x} - \lambda) > u'_i(\bar{x})$ and $u'_i(\bar{x} + \lambda) < u'_i(\bar{x})$ for $\lambda > 0$.

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That said, utility means fundamentally different things to different people. For instance, the ascetic may choose to live a life of self-sacrifice, abstinence and hardship in the pursuit of some higher goal. One would have to go into serious mental contortions (Gary Becker's Nobel prize acceptance speech (Becker, 1993) being a prime example) to fit this story into the box of utility maximisation (see Sen (2009), pp.188-193) and so this causes problems for Utilitarianism and equality of utility.

Sen would also go on to realise that choice is a problem which we must consider. Indeed, both the Rawlsian and the utilitarian philosophies tend to downplay the role of choice outside of being free to make them. We as a society justify wealth often as the reward for choices made which lead to self-distinction through excellence, though this inequality has little justification under the Rawlsian system.⁵

So how does Sen suggest we proceed in obtaining an ultimate aim for policymaking? In what "space" as it were, should we aim to provide equality, since it seems almost a tautology that some form of equality is desirable. In *Inequality Reexamined* (Sen, 1995) he carefully considers this question and arrives at the argument that justice demands equality in the ability to choose that action within your capabilities that would lead to the wellbeing outcome you would have chosen under circumstances deemed socially reasonable.

To elucidate this subtle and sometimes hard to grasp argument, I will sketch the formal statement of the capabilities approach provided in Sen (1999). Suppose that for any given individual, a commodity vector $x_i \in B_{p,w}^i$ ⁶ has certain characteristics that are potentially of use to the agent and assigned to the commodity vector by $c_i(x_i)$. The individual then must select which of a set of actions ("functionings") $f_i(\cdot)$ available to them out of their set of capabilities $F_i(\cdot)$ they will take to transform these commodity

characteristics into a set of outcomes

$$b_i = f_i[c_i(x_i)], \quad f_i(\cdot) \in F_i(\cdot)$$

which will be transformed into wellbeing by some value function $h_i(\cdot)$ so that the agent's wellbeing will be given by

$$v_i = h_i\{f_i[c_i(x_i)]\}, \quad v_i \in V_i$$

Now, the individual cannot fully control where they will find themselves in the set of possible welfares V_i . The commodity vector $x_i \in B_{p,w}^i$ is often constrained unreasonably by poverty or by simple constrained spending capacity relative to what society deems acceptable. Where Sen makes his most significant contribution though is that the choice of the agent b_i is also constrained by the capability set of functionings $F_i(\cdot)$. An agent may want to achieve a certain outcome in their pursuit of wellbeing, but even if they are transferred the resources to do so, they may lack the ability to use the commodity for whatever reason. For instance, a standard car being provided to a paraplegic for transport will be useless since they cannot drive. This idea incorporates the sentiment that choice is important for justice, since an agent must choose to work to earn more than the minimum resources, but unlike the simplistic view of Ayn Rand not everyone has the capability set of John Galt.

Finally, the wellbeing function (not to be confused with a hedonistic utility function) $h_i(\cdot)$ and the characteristic assignment rule $c_i(\cdot)$ are almost entirely unchangeable (though psychologists devote much of their careers to changing the former, and marketers spend vast sums to convince us that the latter can change too!). So in this framework, wellbeing is an ex-post outcome of a constrained process where the choice is to undertake an action that leads to utility rather than the ex-ante choice rule $\max_x \{u(x)\}$ which chooses commodities which yield some assumed welfare.

⁴ Of course, if $u_A(\cdot) = u_B(\cdot)$ then the weak equity axiom would require that $x_A = x_B$ as well.

⁵ It is a stretch to justify an executive's salary or a High Court Judge's salary when their office is not open to all (requiring years or experience and study) or directly beneficial to the poorest of society.

The Philosophy of Justice and

It is the duty of society to decide which commodities x_i are those which the agent must have to achieve a wellbeing that the agent and society deems desirable (this caveat precludes absurd policies like subsidies for caviar to allow high society haute-couture to be part of every individuals capability set). Society also must decide what functionings $f_i(\cdot)$ are necessary to adequately use those commodities and which must be part of the capability set. If society and individuals together deem that a certain functioning b_i^* be part of the capability set $Q_i(x_i)$ then justice demands the state ensure that individuals can choose this outcome. That is, justice requires

$$b_i^* \in f_i^*[c_i(x)] \in Q_i(x_i)$$

where $Q_i(x_i) = \{b_i | b_i = f_i[c_i(x)], f_i(\cdot) \in F_i(\cdot), x_i \in B_{p,w}^i\}$. For instance, it may be decreed that every citizen needs at least a state education to achieve a reasonable wellbeing, and this “primary good” will from now be provided. The citizen then has the opportunity and responsibility to make the choice to attend school or university by selecting the action to do so from their capability set. However, they may live in a remote area without adequate transportation, or they may have such low income that they cannot afford the resources, like textbooks, which would permit effective learning. In these cases, society must also expand the capabilities set through the provision of such services so as to give the individual the capability to choose to receive a good education.

The capabilities approach, like Rawls’ minimax principle have been criticised by Roemer (2009) for not being applicable in reality to policy decisions based on the fact that neither of these authors ever go into detail about what they mean by “primary goods” in Rawls’ case and what are the most important “functionings” in Sen’s. Roemer instead suggests that the policy of the government should be selected according to the maximisation rule

$$\varphi^* = \arg \max_{\varphi} \int_0^1 v^t(\pi \varphi) d\pi$$

where $v^t(\pi \varphi) = E[u_t(\pi \varphi)]$ is an expectation for a class of individuals $t \in T$ and which is stochastic in effort $\pi \in (0,1)$ and where equality occurs when an individual doesn’t suffer because they have bad luck when they’ve put in the same effort as someone else. That is to say, equality occurs when

$$\forall t, t' \in T \ \& \ \pi = \bar{\pi}, v^t(\bar{\pi} \varphi) = v^{t'}(\bar{\pi} \varphi)$$

However, it seems that this method falls under the same criticism levelled by Roemer at Sen and Rawls in that we have to specify what form v^t takes. Such a choice is inevitably made by the policymaker. Moreover, how are we to define “types”. Is t an observation on the income space? Is it better off being a measurement of some form of physical or social deprivation instead? In short, to implement this approach the policymaker would need substantial amounts of high quality knowledge.

By contrast, Sen doesn’t pretend to have a monopoly on conceptions of what should be considered a relevant functioning and what shouldn’t, suggesting that a better answer will come from a process of public reasoning. In *The Idea of Justice* (2009), he sets out a series of ideas for how this process may take place and how a certain measure of objectivity in conceptualising justice can be achieved, though this topic is beyond the purview of this particular exploration, firmly within the realm of social choice theory.

Interestingly, Sen’s theory of justice as providing people the ability to take action in bettering their lives has a firm empirical grounding also. McCarty (2009) notes that studies tend to find that views of justice depend strongly on how individuals feel that inequality to have been formed. They are more likely to think inequality justified if they believe effort plays more of a role in wealth accumulation and high income than mere chance. Hence, not only is

⁶ $x_i \in B_{p,w}^i$ being the budget set of the agent determined by the prices p and the wealth/income w

⁷ Integration across the effort space here allows the policymaker to maximise expected utility across the entire distribution

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Sen's philosophy a good synthesis of the prevailing theories of justice, it also seems to accord with what society actually believes is just, giving it real applicability to a study of economic inequality.

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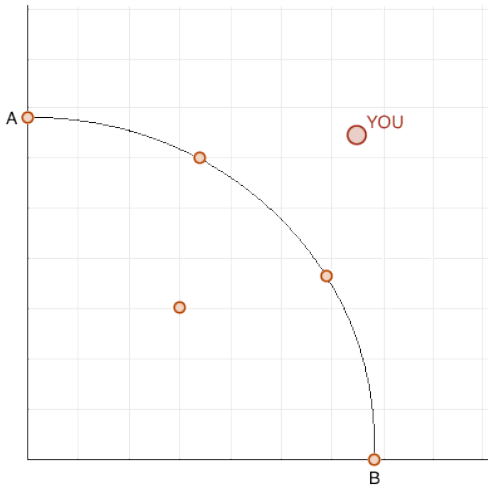
⁷ of effort (not taking it as given), so that effort will still be the choice of the individual, but that choice will be in the context of a policy that will have been set to maximise the expected outcome of that choice.

ECON-COMICAL...

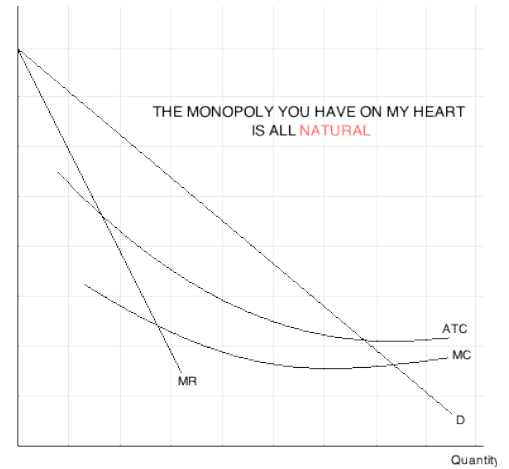
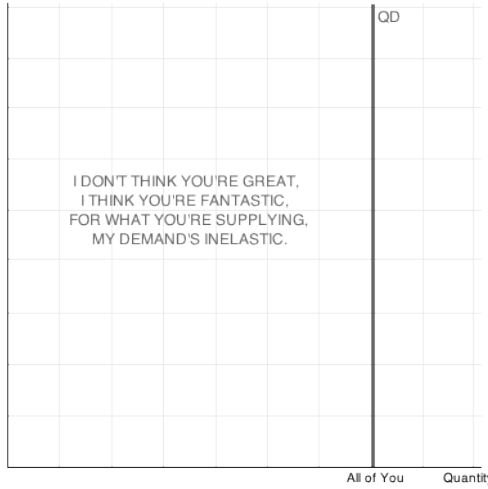
How economists say 'I love you'....

YOU MAKE THE IMPOSSIBLE POSSIBLE

PRODUCTION POSSIBILITIES FRONTIER

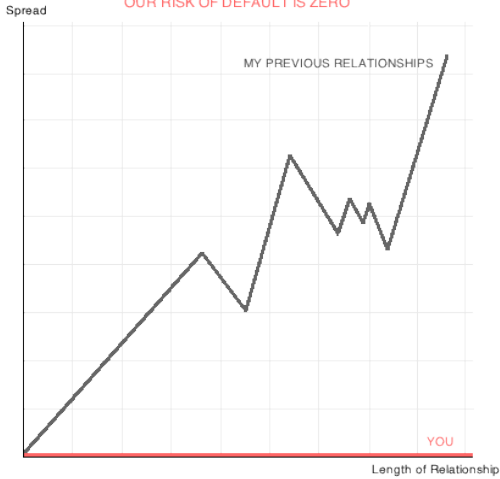


Cost/Time/Whatever it Takes

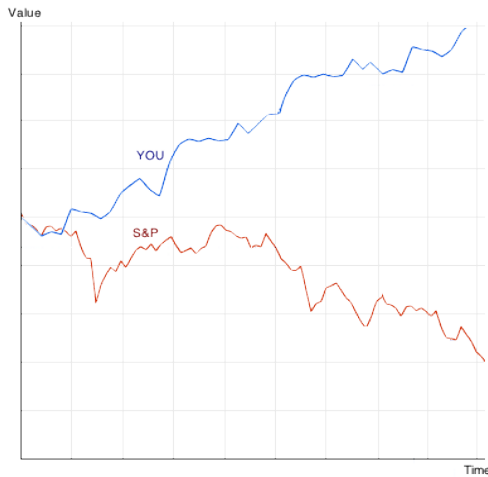


CREDIT DEFAULT SWAP SPREADS

OUR RISK OF DEFAULT IS ZERO

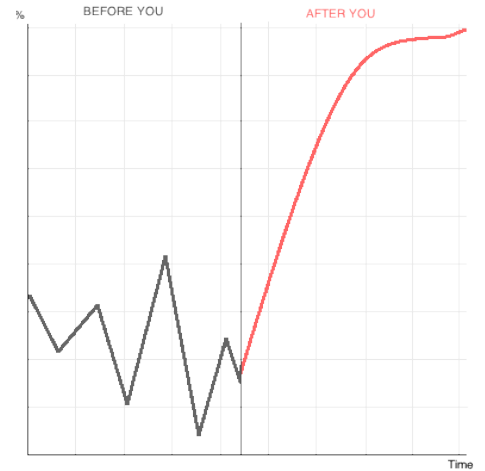


THE S&P WAS IN THE RED, BUT I WASN'T BLUE, BECAUSE I SHORTED THE MARKET, AND WENT LONG ON YOU.



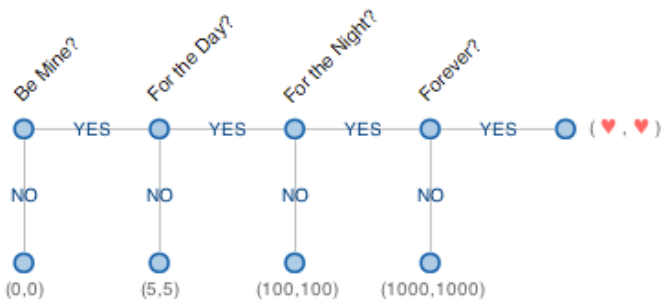
CONSUMER CONFIDENCE

Is 100% expectations about six months ahead, 100% about current conditions.

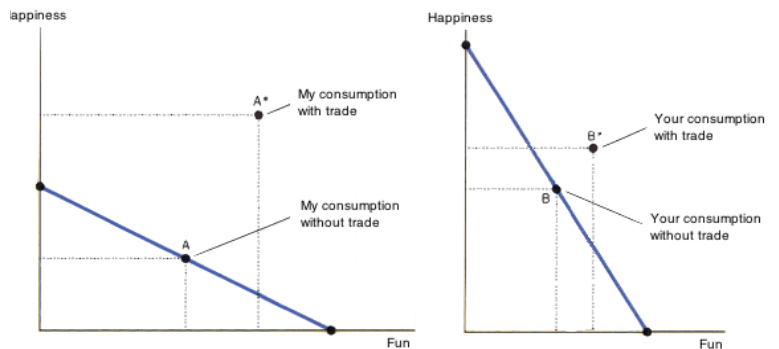


THE LOVE GAME THEORY

THE OPTIMAL STRATEGY IS OBVIOUS



HOW TRADING AND EXCHANGING IDEAS OVER DINNER WOULD EXPAND OUR SET OF CONSUMPTION OPPORTUNITIES



SO IT'S A DATE??

Source: <http://fosslien.com/heart/>

Reconciling Alfred Marshall

by Lawson Ashburner

Alfred Marshall has been identified as providing evolutionary insights concerning economic behaviour, yet he is also listed as one of the founders of the 'neoclassical' economics so strongly criticised by Veblen. Why was it possible for him to hold what seem to be contradictory views?

Introduction

Since the publication of his *Principles of Economics* in 1890, Alfred Marshall has frequently been cited as the father of neoclassical economics. In many ways a refinement of the work of classical economists such as Adam Smith and David Ricardo, neoclassical economics employs formal mathematical techniques within deductive models, characterising people as rational agents optimising their utility or profits subject to limited resources. The techniques involved in these models are borrowed directly from classical mechanics; calculus is used as the method of optimisation, and inbuilt in the system are the properties of homeostasis (the ability to return to the status quo following a temporary disturbance) and time reversibility (the ability to retrace a path previously taken) (Cross 2006: 124-125). In reality, however, Marshall perceived many flaws in this form of analysis. His keen interest in social evolutionary theory led him to conclude that individuals and economic processes could not be modelled in this static, atomistic way (Loasby 2006: 371). Instead Marshall viewed society as organic, in a constant state of progressive evolution through processes irreversible in time. In such a light, human activity cannot be fully understood with neoclassical assumptions and so in his later years Marshall came to desire new base for economic modelling, more analogous to evolutionary biology than classical mechanics, which would recognise this time irreversibility issue. In his own words, "the Mecca of the economist is economic biology rather than economic dynamics" (Marshall, cited in Pigou 1953: 10). Unfortunately, Marshall was never able to establish a sufficiently coherent analytical base along these lines. He instead opted to compromise by retaining the neoclassical framework for its useful properties while both attaching strict qualifications to his findings and incorporating some inductive historical elements in his models.

By taking this pragmatic line Marshall was able to somewhat reconcile the contradictions in his work, however he remained frustrated by the weaknesses in this approach. In this essay I will briefly outline the doctrine of neoclassical economics with particular reference to its timeless, path independent nature. I will then proceed to examine two convergent threads in Marshall's thought, his regard for social evolution and his more technical criticisms of neoclassical analysis and how their intersection lead him to take a pragmatic middle ground which remains influential in modern evolutionary economics.

Neoclassical economics and time reversibility

Neoclassical economics remains the dominant school of microeconomic thought to this day, attracting support due to its theoretical elegance, rigorous mathematical footing and simplicity of application. At the centre of such analysis is the rationality assumption; individuals are modelled as atomistic agents rationally maximising their utility subject to constraints. Utility is determined by a given set of implicit preferences that are assumed to satisfy the properties of consistency, completeness and convexity. More importantly, this formal modelling technique assumes pure self-interest in practical terms and so offers no account of the potential for cooperation, interdependence and altruism (Moehler and Brennan 2010: 946-947). From this base Marshall's *Principles of Economics* popularised mechanical partial equilibrium theory, the model of demand and supply that isolates the market for a particular commodity while assuming away the flow-on effects in other markets. Understood in a purely mathematical context, Marshallian partial equilibrium theory implicitly assumes the properties of homeostasis and time reversibility to be pres-

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ent in the phenomena being modelled (Cross 2006: 124). By way of example, consider a temporary increase in the demand for a commodity. Partial equilibrium theory predicts that such a shock will bring about a temporary movement along the supply curve to a new equilibrium with a higher price and quantity before a return to the initial equilibrium is made as the demand curve shifts back to its initial position. Recognising that a higher price can be charged, firms in a perfectly competitive market will expand production until the marginal cost of this further production exceeds the new market price. It should be noted further here that the theory offers no indication of the time taken to reach this new equilibrium (Foster 2006: 281). When demand returns to its former level, firms will return to producing the original quantity using exactly the same methods. The system is entirely unchanged in the aftermath and hence is entirely homeostatic and time reversible. Following directly from this is the concept of path independence; the discussion above makes it clear that the nature of an existing equilibrium is in no way dependent by the manner in which that equilibrium was reached. Even neoclassical models that attempt to incorporate the passing of time through a short run/long run distinction still maintain these properties. These periods are not defined by time itself, but rather by the degree of capital rigidity; in the long run capital can move freely between markets while in the short run it is fixed. The process is still entirely reversible, however; the movement of capital is in no way affected its former employment.

Marshall and evolution

When investigating the more evolutionary trends in Marshall's thought, it is necessary to determine precisely what he thought of as "evolution". In the modern, biological context evolution implies a Darwinian meaning. Darwinian evolution is entirely devoid of a notion of progress toward an "ultimate state of affairs" (Moss 2010: 365). Evolution occurs entirely due to ecological factors through random mutation and natural selection; hence there is no deterministic element in the process. Marshall's evolution, by contrast, was in keeping with the more social understanding of the concept promoted by

Herbert Spencer, which did assume a forward-moving progressive element. Agreeing with this broad interpretation of Marshallian evolution, J. Stanley Metcalfe states "...we should be clear that what matters in interpreting Marshall is not any question of biology *per se* but rather the nature of the evolutionary reasoning of which biology is just a branch" (2006: 651). Interestingly, in the biological context Marshall held the now-defunct Lamarckian claim that acquired characteristics could be genetically inherited, in many ways analogous to his understanding of societal evolution (Moss 2010: 366). While this misunderstanding of evolutionary biology is of little consequence to his abilities as an economist, it highlights the bias Marshall felt toward seeing a progressive element to society.

In Marshall's view, evolution was both group-centric and individual-centric. Always highlighting the gradual nature of evolutionary change, in the group-centric context Marshall saw society progressing from a homogeneous state toward a more evolved heterogeneous state through the twin processes of differentiation and integration (Tezel 2006: 265). Differentiation is the process of increasing subdivision and specialisation; in practise this is manifest in the division of labour, which leads to the growing of specialised skills, knowledge and machinery. Running parallel, integration is the growing interconnectedness of these specialised parts, evidenced prominently by improvements in transportation and communication (Marshall, cited in Foster 1993: 987). John Foster regards this as evidence of Marshall's grasp of the self-organisational process, a key theme in modern evolutionary economics (1993: 987). In the individual-centric case, Marshall's evolution relates to the cumulative (and hence irreversible) nature of knowledge growth. The differences that individuals possess in human nature, motivation and business abilities not only increase the growth of knowledge through learning from one another (Metcalfe 2006: 653), but also lead to new methods of organisation, feeding back into the process of differentiation and driving group evolution. The institutions that come of this group evolution, such as better educational facilities and practises in turn lead to a better knowledge growing

process and so the group-centric and individual-centric effects are mutually reinforcing.

Marshall's criticism of mechanical systems and neoclassical economics

Given his view that society and individuals are evolving in a closely linked manner and his preference for realism over rigour, Marshall naturally took issue with the mechanical economic methodology he supposedly fathered. Despite his mathematical talent, Marshall was critical of the tendency of some to overuse mathematics in economic analysis. He once wrote:

(1) Use mathematics as shorthand language, rather than as an engine of inquiry. (2) Keep to them till you have done. (3) Translate into English. (4) Then illustrate by examples that are important in real life (5) Burn the mathematics. (6) If you can't succeed in 4, burn 3. This I do often. (Marshall, cited in Pigou 1953: 8)

While Marshall clearly regarded mathematics as a powerful tool, he saw that it risked overshadowing the economic principles themselves. This notion is indicative of Marshall's approach to economics.

To begin at a foundational level, Marshall did not believe individuals to be atomistic and self-interested, the underpinning of neoclassical utility theory. His rejection of "economic man" was for multiple reasons; firstly, as explained above Marshall saw society and individuals as inextricably linked; any attempt to view individuals in isolation would hence be erroneous. Secondly, Marshall conceived people as acting habitually, according to set routines rather than continuously seeking to optimise their utility (Raffaelli 2003: 50). In this light a more historicised account of human behaviour would be preferable if it could grasp the path dependent development of these routines. Finally, Marshall recognised that individuals have a plurality of motives, both egotism and altruism, which are lost in the narrow self-interest of utility theory.

Moving toward the more mechanical properties of neoclassical analysis, the time reversibility and path

independence inherent in these models formed larger source of contention for Marshall. Following from the logical flaw that preferences regarding yet to be experienced events cannot be known, Marshall observes of temporary decrease in demand:

...habits which have grown up around the use of a commodity while its price is low, are not quickly abandoned when its price rises again – for instance, the price of cotton during the American war was higher than it would have been if the previous low price had not brought cotton into common use to meet wants, many of which had been created by the low price. (1920: 666, emphasis added)

Neoclassical utility theory assumes that if such uses for cotton were desirable at the original market price, they would have been known of and exploited, allowing reversibility. The contradiction highlights the differences between Marshall's emphasis on routines and utility theory; for Marshall, these new uses for cotton become irreversible routines while the neoclassical economics suggests they will cease to be once prior conditions are restored. Similarly, Marshall observed of the supply side of the market in the presence of economies of scale:

...when any causal disturbance has caused a great increase in the production of any commodity, and thereby has led to the introduction of extensive economies, these economies are not readily lost. (1920: 660)

By assuming homeostasis, the neoclassical model fails to recognise that a large increase in production brings with it new production techniques and routines, permanently altering the *structure* of the system. A movement back along the supply curve is thus not possible. As Brian Loasby explains:

Increasing return is not a property of any production function, but the outcome of a cognitive process in a changed setting; in the economy as in the brain, the gains are attributed not to the elements but to the organisation of more productive connections between them and the removal of the connections which inhibit im-

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provements. (2006: 375)

It must be noted, however, that Marshall did believe all fluctuations to be irreversible. If a change to the present equilibrium were minor and expected, it would likely have no structural impact, as the present set of routines would be ready to incorporate it. For example, expected seasonal variations in the demand for a commodity do not bring structural change and so can be reasonably assumed to be reversible (Raffaelli 2003: 45). Similarly, Marshall understood the reversibility of temporary unexpected changes to demand or supply of low magnitude, especially over a short period of time where there is little scope for structural change. In many ways this mirrors Marshall's view of evolution; these structural changes caused by the inadequacy of old routines rely on the variation in, and growth of, knowledge, which leads to the evolutionary processes of integration and differentiation as productive techniques are improved. In Tiziano Raffaelli's interpretation of Marshall: "The evolution of the economic system, like that of any other system, is a continuous succession of unexpected impulses and adaptive reactions" (2003: 46).

Marshall's pragmatic solution

In understanding how Marshall reconciled the contradictions in his work, it is important to realise that his goals were more realistic than many other economists. For example, classical economists such as Ricardo and John Stuart Mill sought to formulate an all-encompassing analytical value theory, applicable in every situation and through all time. Understanding the driving force of societal evolution as he did, however, Marshall sought not to explain the entire economy through a comprehensive model, but rather to explain through partial equilibrium analyses the role market exchange plays in shaping the ever-present evolutionary process (Raffaelli 2003: 42).

Marshall could then accept contradictions in his work in the way that general equilibrium theorists seeking to simultaneously explain all phenomena could not, provided that these contradictions were due to the recognised complexity of the system and

the conclusion that a plurality of models was required to handle different circumstances and time-frames. These limited objectives allowed Marshall to more easily adopt his pragmatic method, which involved retaining the neoclassical metaphor for its usefulness but carefully qualifying his findings (Foster 1993: 976) and at times including more realistic, inductive elements in his models.

As well as removing the obligation to simultaneously explain all economic behaviour, Marshall's preference for partial equilibrium analysis made it easier for him to reconcile his more evolutionary insights with a mechanical modelling process. Recognising comparative statics to be analytically powerful but potentially misleading due to their assumed reversibility, Raffaelli argues that Marshall found a middle ground whereby he used the device but emphasised that his conclusions were "...relative to initial conditions and dependent on the range of functions which are allowed (and which are a function of time)." (2003: 45). As such, Marshall's static conclusions cannot be understood without being seen as an add-on to the dynamic economic system, forever in a constant state of gradual evolution (Raffaelli 2003: 45). Following from this, Marshall saw equilibrium as not a static situation that changes suddenly in the face of an exogenous shock, but as more loosely defined, where shocks bring gradual shifts with hard to define beginnings and uncertain conclusions. Further, consistent with his evolutionary understanding of individual behaviour, the changes in routines that lead to shifts in the equilibrium state cumulatively build knowledge of new routines. Hence, the equilibrium is path dependent, built upon the past experiences of individuals (Raffaelli 2003: 46).

Intrinsic to this methodology is Marshall's adoption of the *ceteris paribus* clause in his reasoning. Meaning "all things being equal", the device allows for comparative statics by isolating the variable in question. Marshall recognised that such a method requires a trade-off however; the more a variable is isolated, the more precise are the predictions of that variable in a mathematical sense but the less likely those predictions are to be correct in reality (1920: 366). Such a trade-off mirrors Marshall's seeking of

a middle ground between realistic but analytically difficult evolutionary thinking and more unrealistic but analytically pleasing mechanical neoclassical modelling. Marshall accordingly advised that the *ceteris paribus* technique can be safely used where it amounts to ignoring the slow evolutionary nature of the economic system in favour of investigating small temporary shocks, but less effectively where the shocks are large, such that they may bring structural change to the system (Raffaelli 2003:46).

Time period analysis represents the most profound way in which Marshall attempted to incorporate irreversibility into his modelling process. By identifying four distinct time periods, the market period, the short run, the long run and the secular period (Raffaelli 2003:43), Marshall was able to detail how the consequences of a shock to the market system move from being initially fast, direct and reversible in the market period to slow, indirect and irreversible in the secular period as structural change takes place within the industry (Raffaelli 2003:47). While textbook neoclassical economics also makes a short run/long run distinction, the time periods are there defined purely in terms of capital fixity and all results are ultimately reversible in the long run. Marshall, however, more loosely defined his periods in terms of operational (or process) considerations or actual time itself. The distinction between these was made on the grounds of the flexibility the firm had with regard to its expectations of future demand (Foster 2006:282). The result is that changes become less and less reversible as the system moves toward the secular (very long run) period. In his realisation that the secular period is thus better understood by economic evolution, Marshall rejected deductive logic when drawing his falling long run supply curve, instead adopting an inductive, historicised construct (Foster 1993:980).

Conclusion

While the influence of Marshall over the neoclassical school has never been in doubt, it has taken the post-1980s re-emergence of evolutionary economics for the depth of his work to be truly understood. Even with the advent of computer modelling, the emergence of a biological, time irreversible modelling metaphor to seriously challenge neoclassical

mechanics has not been forthcoming. Marshall's proposal of this research project in his later years remains unfulfilled. In the meantime, the economics profession could do well by embracing the pragmatic realism of Marshall's work, recognising the weaknesses in existing models and qualifying results accordingly, rather than focussing so heavily on theoretical perfection. Technical aspects aside, perhaps this is Marshall's greatest legacy.

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