Comments on Adam Smith's Use of the 'Gravitation' Metaphor

Gavin Kennedy

Abstract

I offer a comment on a paper by Prof David Andrews, 'Adam Smith's Natural Prices, the Gravitation Metaphor, and the Purposes of Nature', 2014, published in *Economic Thought*, 3.1, pp. 42-55, which takes a philosophical view of Adam Smith's use of the 'gravitation' metaphor from ideas of Aristotle and Empedocles, in contrast to Isaac Newton's. Instead, this paper takes the view that Smith simply used a metaphoric 'figure of speech' that followed his teachings (1748-64) on Rhetoric, as in his "Lectures on Rhetoric and Belles Lettres' (LRBL, 1762-3). Smith's use on this occasion was not based on a deeper philosophical meaning of the word 'Gravitation', interesting as that view may be, as shown by David Andrews. Nor was the deeper philosophical interpretation entirely relevant to Smith's literary purposes on this occasion. His purely rhetorical use of 'gravitation' is consistent with his LRBL teachings on perspecuity of style and illustrated in his long explanation of the dynamic relationships between 'natural' and 'market' prices in WN (1776: I.vii-xi.p, pp.72-267).

Keywords: Adam Smith, natural price, normal price, gravitation, sellers' and buyers' behaviours, metaphors.

David Andrews's interesting short-paper is instructive. It prompted me to recount the interpretation of Smith's use of metaphors, on this occasion confined to the use of 'gravitation' to describe a relationship between 'natural' prices before products are sold in markets and producer's costs are not yet earned from sales — a sort of ex-works, 'factory-gate' price —, and 'market' prices which are determined in actual markets where actual sellers offer their products for sale to actual buyers ('effectual demanders').

Paranthetically, David's interesting paper also provoked memories of attending, long-ago, A-level Physics classes for university entrance exams and subsequently, in later years, when first reading Adam Smith's use the 'gravitation' metaphor. This background leads me to a different take to David Andrews's philosophical interpretation of Smith's use of the 'gravitation' metaphor in Wealth Of Nations (WN I.v.ii: '*Of the natural and Market Price of Commodities'*, pp. 72-81).

Since 2003, I have taken a particular interest in Adam Smith's use of metaphors throughout his Works, especially the metaphor most closely associated with his name today in respect of his use of the 'Invisible Hand' metaphor (see: www.adamsmithslostlegacy.blogspot.co.uk, 2005-14: and Kennedy, 2005, 2008, 2009, 2010, 2011, 2013, 2014). I suggest that Adam Smith's exposition of the uses and meaning of 'figures of speech' is applicable to his use of metaphors elsewhere in his Works. From this background, I believe that Smith's use of the 'gravitation' metaphor in WN was quite different from David Andrew's philosophical interpretation (Aristotle and Empidocles) in his paper, and in his comments on the apparent support for his views in Marshall and several modern economists: Pierangelo Garegnani (Garegnani 1976, p. 27), Geoffrey Harcourt ((Harcourt and Kriesler 2012, p. 9), Ian Steedman, John Eatwell and Murray Milgate (Eatwell and Milgate 1999, p. 83), Tony Aspromourgos (2010, pp. 65-6), Heinz Kurz and Neri Salvadori' (Kurz and Salvadori 1998, p. 3) and Piero Sraffa's *Production of Commodities by Means of Commodities: Prelude to a Critique of Economic Theory*. Interesting as these authorities undoubtedly are they do not quite clarify Smith's use of 'gravity' as a metaphor in Wealth Of Nations.

David sets out his case in his abstract:

"*The first section examines the context in which Smith's gravitation metaphor appears in order to show that it was intended as an assertion about the movement of market prices rather than one about the meaning of natural price. Section Two explores the gravitation metaphor in detail to show that what Smith described is gravity in the ancient rather than the modern* *sense, implying that movement results from the inclination of market price rather than from any property of natural price. The third section focuses attention on Smith's understanding of nature, arguing that, according to Smith's Aristotelian usage, 'natural' refers to the reproduction of species, including the human species. Based on this discussion, Section Four presents an interpretation of the sense in which natural prices are said to be natural in Smith"* (Andrews, 2014, p. 3)

He also asserts:

"*For Smith, [Gravitation] is not a Newtonian metaphor for the attractive character of natural price, but rather an Aristotelian metaphor for the pattern of movement of market prices, in which natural price serves merely as a reference point*" (Andrews, 2014. p.2).

This paper explains why I regard the *relevance* of David's philosophical interpretations somewhat sceptically. First, I examine Adam Smith's teaching and use of metaphors and, second, I comment on David Andrews's arguments on 'gravitation' in its "Epidoclean", and not its "Newtonian", sense in relation to the relationship between 'natural' and 'market' prices (WN I.ii.vii-xip).

Smith on metaphors

Smith showed his understanding of, and demonstrated with examples, the role of metaphors in English rhetoric from his 9 years attending Moral Philosophy and Rhetoric courses and private readings (Glasgow: 1737-40 and Oxford: 1740-46), followed by 15 years of teaching classes on Rhetoric in Edinburgh in his public lectures (1748-51) and at Glasgow University in his giving his private rhetoric lectures (1752-63).

More importantly, we also have a verbatim set of student notes reporting Smith's Rhetoric Lectures in his Glasgow University private class of November-February 1762-3: (Smith, LRBL, 1983). In that series he gave four lectures on 'figures of speech' ('metaphors, similes, tropes, allegories, hyperbolls, and metonymies', LRBL, pp. 20-51).

I suggest that Smith's use of 'figures of speech' in his teaching and writing demonstrates his understanding of the proper (i.e., conventional) English language use of metaphors, along with other 'figures of speech', located throughout his Works and Correspondence. For the record, I also note that Smith's use and teaching on metaphors conforms to traditional and modern usage of metaphors in the English language (see: The Oxford English Dictionary, 2nd ed. 1983). Yet, surprsingly, very few, if any, modern economists (including David Andrews in his paper) refer to Smith's teachings on metaphors, while they make confident assertions about what Smith supposedly meant when he used ‘gravitation’ metaphorically as a figure of speech.

Surprisingly too, even the late Warren Samuels, undoubtedly, in my view, the most diligent and thoughtful Smithian scholar since the 1940s, who wrote extensively and authoritatively on Smith’s most famous metaphoric use of the “invisible hand”, did not cite nor discuss Smith’s teachings on metaphors, despite discussing the metaphoric role of the ‘invisible hand’, beginning with Samuel Johnson’s dictionary (1755), and citing other modern authorities through to the end of the 20th century (Samuels, 2010, pp. 151-63).

Smith was very clear and specific on the role of metaphors in English rhetoric and in perspicuous writing, making his teaching on metaphors highly relevant here. He defined the metaphor’s role “*to describe in a more striking and interesting manner*” its ‘object’, which ‘object’, in the only three examples he gave of the ‘invisible hand’, he either identified their ‘objects’ directly or indirectly, or they were obvious from their contexts (see Kennedy, 2009-14). Metaphors are closely related to their ‘objects’ and have no metaphoric meaning outside of their objects.

The modern habit of re-interpreting Smith’s meaning, for example, by asserting that the ‘invisible hand’ metaphor referred to something else entirely besides their proper objects is erroneous. Among such attributed ‘objects’ claimed to be his ‘meaning’, we are offered: ‘supply and demand’, ‘markets’, ‘Pareto’s first theorem’, ‘prices’, ‘general equilibrium’, the ‘hand of God’, or ‘competition’, and such like). There is no basis for such misattributed ‘objects’, nor are they helpful when conveying Smith’s alleged meaning, and,sadly, mislead the millions of readers who have read or heard of and accept on trust such misleading attributions!

Both of Smith’s Moral Sentiments (TMS, 1759) and Wealth Of Nations (WN, 1776) are “tinctured strongly” with metaphors. Here are just three prominent examples:

Metaphor 1: “the great wheel of circulation” — Object “the annual circulation of metal pieces …that distribute to every man [his] revenue”;

Metaphor 2: “waggon way through the air” –- Object: “the effect of the circulation of gold and silver, creating good pastures and fields”;

Metaphor 3: “Daedalian wings” — Object: the insecurity of paper money versus the security of the “solid ground” of gold and silver (WN II.ii.86, p. 321).

In two of these examples the metaphor is to be taken only figuratively not literally: there are no ‘waggons flying through the air’ and nor were a pair of actual feathered wings fixed by Daedalus onto his son’s (Icarus’s), arms with wax, to enable him to escape the Minitour - his flight did not take place in reality - it was an albeit brilliant but imaginative and fictional myth brilliantly transposed by Smith into a metaphor for less reliable paper money compared to solid gold.

Likewise, Smith's use of 'gravity' as a metaphor did not imply Newton's nor Aristotle's/Empedocles's theories of gravity. Metaphors do not exist in reality; they are 'figures of speech' that are used to "describe" some object to readers, educated in classical mythology in the case of "Daedalian wings", "in a more striking and interesting manner" (Smith, LRBL, p. 29). Of course, if Smith's readers had never heard of Daedalus, Icarus, or the Minitour, the metaphor would remain obscure and they might miss the Smith's literary allusion.

I suggest that the only guide we need to understand Smith's intended meaning when he uses metaphors in his writings is the certainty that they conform to his sense of 'perspicuous' writing, which his well-chosen metaphors invariably demonstrated in his published Works (though he admits, apologetically, that his "waggon way" example was a "violent" metaphor, WN II.ii.86: p. 321). Therefore, seeking deeper or wider meanings does not add to the important qualities of perspecuity that Smith admired and encouraged his students to follow (LRBL, i.9.10: 6). He also made his intended meanings clear to readers by way of introducing some of his tediously/notoriously difficult passages that followed in his chapters (WN. I.v: 47- I.xi.p: 267) on the unstable ‘coincidence’ of ‘market’ and ‘natural prices’:

“*I shall endeavour to explain, as fully and distinctly as I can, those three subjects in the three following chapters, for which I must very earnestly entreat both the patience and attention of the reader: his patience, in order to examine a detail which may, perhaps, in some places, appear unnecessarily tedious; and his attention, in order to understand what may perhaps, after the fullest explication which I am capable of giving it, appear still in some degree obscure. I am always willing to run some hazard of being tedious, in order to be sure that I am perspicuous; and, after taking the utmost pains that I can to be perspicuous, some obscurity may still appear to remain upon a subject, in its own nature extremely abstracted*” (WN I.iv.18: p. 46).

Here is an contemporary example of the appropriate use and meaning of metaphors in relation to their objects from Smith’s close social friend, Hugh Blair, a popular Presbytearan preacher and Enlightenment colleague who, after Smith left Edinburgh for Glasgow, (1751) took over his successful public Rhetoric lectures in Edinburgh. Smith also showed him some sheets of his lecture notes (Blair, 1812, ii.22 n.). Blair followed Smith's exposition of the rhetorical role of metaphors, which conformed to Smith's three different examples of the "invisible hand" metaphor and, incidently also conform to modern English usage (cf. Simpson and Weiner, 2nd ed. 1983/1989, vol. IX, p. 676). Subsequently, Blair became Edinburgh University's first Professor of Rhetoric (Ross, 1976, p. 96; 2011, p. 92):

"*When I say of some great minister that he upholds the state, like a Pillar which supports the weight of a whole edifice. I fairly make a comparison; but when I say of such a minister that, he is the Pillar of the state, it is now become a Metaphor. The comparison betwixt the Minister and a Pillar is made in the mind, but is expressed without any of the words that denote comparison. The comparison is only insinuated, not expressed: the one object is supposed to be so like the other, that, without formally drawing the comparison, the name of the one may be put in place of the other: 'The minister is the Pillar of the state.' This therefore, is a more lively and animated manner of expressing the resemblances which imagination traces among objects. There is nothing which delights the fancy more, than this act of comparing things together, discovering resemblances between them, and describing them by their likeness. The mind, thus employed, is exer-*

cised without being fatigued; and is gratified with the consciousness of its own ingenuity. We need not be surprised, therefore, at finding all Language tinctured strongly with Metaphor." (Blair, 1787, vol. 3. pp. 372-3).

'Gravity' as a Metaphor

First, the metaphoric meaning of 'gravity' in the context described in Wealth Of Nations is not necessarily bounded by Newton's nor Empedocles' (490–430 BC) technical ideas on gravity. It was sufficient that readers of WN had some general idea of gravity as an analagous metaphoric force of some kind operating on the behaviours of 'natural' and 'market' prices as people on both sides of transactions reacted to changes in their related and linked variables. Smith seemed otherwise to consider Newtonian mechanics as the 'gold standard' for 18th-century science in his posthumous 'History of Astronomy' (EPS, 1795. pp. 31-105). His private library contained some of Newton's major Works, including 'Opticks', 'Philosophie naturalis principia mathematica', and 'Fluxions and Infinite series' (calculus, etc.), none of which were essential pre-reading for general readers of WN (Bonar, 1894. pp. 122-3).

Smith was fluent in Latin - a prerequisite for his professorial duties requiring him to teach classes using Latin (a practice that was gradually abandoned from mid-1730s to the mid-20th century - though I am informed that grace before meals is still recited in Latin at Oxford) - and certainly he had read his Newtonian books in Latin in his private Library. He also understood Greek from his Kirkcaldy school days and he was familiar with the philosophical ideas of Aristotle and Empedocles.

Gravity is more complex than its Newtonian popular core definition when confined to its properties between two masses and their mutual gravitational attractions. The 'mutual attraction of two bodies', which to the frivolous smirks of young students was summed as "the mutual attraction of two bodies is inversely proportional to the square of the distance between them" (see the Sydney University Student newspaper, '*Honi Soit*', which often carried this definition as a boxed paragraph on its front page, to the amusement of smirking students and the ire of publicly prudent faculty - it was after all, the mid-1950s).

However, gravity is much more significant than just two bodies in proximity. All bodies with mass exert gravitational pull on all others, but not all of them have the same mass and exert the same degree of mutual attraction that draws them towards each other or holds them close in orbits. It does not follow that Smith's intended use of 'gravity' as a metaphor was to describe an observed or plausible relationship of market prices that were sometimes above or sometimes below natural prices, as described in WN. Its metaphoric use was not intended as a scientific statement about the physics of gravitational attraction applied analogously to natural and market prices (which prices of course do not exhibit the physics of 'mass').

In Smith's statement of the relationship between 'natural' and 'market prices' he half-apologetically hints of his metaphoric, and not his scientific, purpose when he writes: "t*he market price of every particular commodity is in this manner continually gravitating*, ***if one may say so,*** *towards the natural price*" (WN I.vii.20: 77). If it was a scientific statement, Newtonian or Epidoclean, he would have left out "if one may say so" because for clear identity statements of science no such semi-apologetic statement would have been appropriate, bearing in mind that not all of his intended readers were expected to have studied classical or philosophical history.

Smith qualifies, in the round quite heavily, his assertions about 'natural' and 'market prices. Indeed, the immediately following chapters go into great detail about the necessary qualifications of the metaphorical 'gravity' relationship: "*yet sometimes particular accidents, sometimes natural causes, and sometimes particular regulations of police, may, in many commodities, keep up the market price, for a long time together, a good deal above* *the natural price*." To which consequence we may be sure producers were quite relaxed about, though consumers may not have been.

This is where Smith's application of the gravitation metaphor captures the essence of his thoughts on the changing relationships bound into his concepts of 'natural' and 'market' prices in "every society and neighbourhood", and for all commodities in them over time. What affects the rent, labour and profits of stock for any commodity may affect their 'natural' and 'market' prices, from changes in "effectual demand" operating on them in different degrees and for different time periods from various sources. All of these forces involve the actions of individuals affected by them; their actions affect the forces and the actions of other players as they are affected by them.

Changing prices may be inanimate, but the agents affected by them are very much alive and can and do react purposively. Some react by doing without the goods on sale, others adjust the spread of their purchases; some sellers withdraw from producing goods that do not earn their outlays, after, perhaps, selling their already produced goods at a loss, and others produce more to gain additional sales at higher prices, or take their goods to more distant markets unaffected by the local trends in market prices. Markets are alive with people whose considered actions affect each other in numerous ways, causing further actions and re-actions among people. Markets, if you like, are alive with people acting according to stimuli.

In the 18th century, observes Smith, society consists of numerous local neighbourhoods, with numerous commodities entering and leaving their neighbourhoods under different conditions of 'effectual demand' and 'supply' (themselves in chains of production and assembly under their varying local conditions). Whatever else this analysis represents, it is not an image of single commodities from a single supplier and a single customer in a basic permanent bilateral relationship as represented in the standard Marshallian suppply-and-demand cross. Smith tackles the evident complexities head-on to show that 'natural' and 'market' prices are not always identical but change as they vary separately and reactively.

'Natural' and 'Market' prices are subject to changes determined at any one moment in complex interactions of people in many changing ways, that Smith describes in their multiple, complementary, interactive and variably over a total of 135 pages in WN (I. vii-xi: pp. 72-267), addressing definitions of 'natural and market prices', variations in the 'wages of Labour'; variations in 'Profits of Stock'; differencies in 'Wages and Profits in Different Employments of Labour and Stock', 'Inequalities from the Nature of Employments themselves', and 'Inequalties occasioned by policy in Europe', all of which separately and together make for an exhaustive treatment of the complexities of the 'gravitating' relationships between 'natural' and 'market' prices. These very detailed chapters in WN (known to weary impatient readers) are followed by a very long chapter covering variations in 'Land Rents' (WN I.xi), and by 'digressions on variations in value of silver over the last four centuries, and the progress of 'Improvement'. Together they constitute substantial evidence that the initial analysis of 'Natural' and 'Market' prices is not a simple statement of a singular concept but an attempt to describe and explain the complex changing phenomenon in real life, compared to the mmodern ultra-sparse, Marshallian cross, which modern students are drilled in as if it fully accounts for phenomena in the real world. Trying to describe these many interactions is a relatively harder task for the clearest of thinkers who pay attention to Smith's analytical descriptions throughout WN (I.ii - xi.p: 72-267). I remined readers of Smith's advice to those who weary of the details assembled in his writings on what he regarded as relationships of some importance, that between 'natural' and 'market' prices (and similarly elsewhere in WN on other changing relationships) quoted in p. 9 above, from WN I.iv.18: p. 46.

The sparse S-D cross assumes the reality of people out of existence which deprives readers of an appreciation of supply and demand in real life that were common in the old-style street markets that abounded in Smith's times. Reading these chapters in WN we may appreciate the relevance of Smith's use of the 'gravitation' metaphor to help to describe his observed relationships between 'natural' and 'market' prices in the simplest of cases. I doubt if Smith was consciously doing other than taking the broadest metaphoric interpetation of gravity without drawing on the the classical subtleties of Aristotle and Empedocles's philosophy, as identified by David Andrews (interesting as it is).

Markets in Smith's time were dispersed, as he would have noticed from his intimate knowledge of local markets in Kirkcaldy's long High Street, where he lived with his mother, and on his excursions from his mother's back garden, along the shoreline to the nearby busy Kirkcaldy harbour in the Firth of Forth (where his father had been a customs officer) and which was within sight from his mother's rear garden. It was often crammed with ships, both local and sea-going to England (Newcastle or London) and on to more distant destinations in the Baltic or Channel ports. Edinburgh is directly across the Firth of Forth with the ports of Granton and Leith (close to the then Royal Navy's anchorage at 'Leith Roads'), serving markets in

Edinburgh, also small ports to the west, serving Stirling, Dunfirmline, Falkirk, and to the east coast serving St Andrews, and on the long-roundabout northern-coastal route to the Alantic and to the Clyde ports of Glasgow. Smith, as a youth, was familiar with Scottish sea-going trade and even more so in later years when he was a Commissioner of Customs in Edinburgh (1778-90) and he could observe the Firth of Forth and ships anchored at ‘Leith Roads’ from his Commisioner’s offices. He also lived in Panmure House (1778-90), just off the High Street/Royal Mile, along which he walked, or was carried by chair-porters, each working day, directly through the bustling street markets of Scotland’s capital city. In London too, busy street markets were located close to Suffolk Place (the ‘Scotch quarter’) and to nearby Charing Cross and Covent Garden, where he lodged for months at a time on his several visits to London. These practical experiences of noisy local markets and their mental images gave him some idea of how natural supply and market prices, and supply and ‘effectual’ demand interacted in the real world, which he addressed in WN I.ii.vii.

The ‘Natural Price’ was a commodity’s ‘central’ price, not least because it reflects a commodity’s supply or cost-price for producers (inclusive of their expected profits), which, when earned repaid the seller’s costs, plus his expected profit, which were ’precisely what it is worth, or what it really costs the person who brings it to ‘market’. This price was likely to be very much to the fore in a seller’s mind and therefore guide his decisions (*‘His profit, besides, is his revenue, the proper fund of his subsistence”*). The ‘natural’ price repaid the capital laid out in assembling the product from the factors of production (rent, materials, labour and, from the seller’s revenue obtained in the selling price including the seller’s expected profits). If for any reason that price was not forthcoming in the actual revenue received from the market price, the seller’s income fell below his expectations and does not repay him ‘*what they may very properly be said to have really cost him*’ (WN I.vii.6: 72-3). This would provoke conscious consequential actions by a seller. Smith describes the actual selling price of a commodity as its “market price”.

Selling prices could fall below the seller’s costs and, should that situation last for ‘any considerable time’ the seller may “change his trade”, with the caveat, where there is “perfect liberty” (WN I.vii.6: 73). Such failed expectations however could not be sustained indefinitely. Sellers were not imbued with a passive acceptance of losses - if she received less than the ‘natural’ price, she lost some of the money that she’d already outlaid in bringing her sellable products to market, and she may review her future as a seller of that commodity, and/or her methods of producing the product for current costs, if her 'natural' (cost plus profit) price was not met. 'Market' prices changed because they were "regulated" not by the sellers desires but by the buyers' "effectual demand" - that is by the demand occasioned by the buyers' ability or willinness to pay the selling prices of the products sellers offered for sale.

Smith summarises the meaning of "market prices":

"*The market price of every particular commodity is regulated by the proportion between the quantity which is actually brought to market, and the demand of those who are willing to pay the natural price of the commodity, or the whole value of the rent, labour, and profit, which must be paid in order to bring it thither*" (WN I.vii.8: 73).

Those buyers willing to pay the market price were the "effectual demanders" and their combined purchases were the "effectual demand", which is the reference point for the seller's prior actions before bringing her products to market, which actions include actual production costs, wages paid out and costs of any components in the product and her expectations of profits.

When sellers bring to market insufficient products to meet the effectual demand at existing prices, then some buyers, rather than do without the product, will offer the sellers higher prices to satisfy their effectual demand, and thereby competitively bid market prices upwards, "according as 'either' the greatness of the deficiency, or the wealth and wanton luxury of the competitors" (WN I.vii.9: 74). Similarly, when the quantity brought to market exceeds the effectual demand, *"it cannot be all sold to those who are willing to pay the whole value of the rent, wages and profit, which must be paid in order to bring it thither. Some part must be sold to those who are willing to pay less, and the low price which they give for it must reduce the price of the whole. Market price will sink more or less below their natural price according as the greatness of the excess increases more or less the competition of the sellers, or according as it happens to be more or less important to them to get immediately rid of the commodity*' (WN I.vii.10: 74). In short, market prices respond to 'effectual demand', tending to rise in times of shortages in supply and to fall in times of surplus supply. Perfect coincidences in 'effectual demand' and 'actual supply' is not guaranteed and the necessary adjustments to actual demand and actual supply may take time to settle. Consider that shortages of fish from local fishing boats means that boats must leave their ports sooner to catch more fish and such purposeful trips take time to visit their fishing grounds and to return to port.

All these explanations of shifts in supply and demand offers and counter-offers relate to the central relationship of 'effectual demand' and actual supply in adjusting selling and buying prices to the market's 'effectual demand' and how all parties to these transactions, such as landlords, who adjust the amount of land they use in their contribution to final product, labourers, who adjust their labour from the stock of labour involved in production, and employers, who adjust their capital stock involved in production to raise or lower the natural prices of the product to satisfy effectual demand. Of course, there are inevitable time-lags as the factors of production, land, labour and capital, commence and complete their adjustments and the inevitable readjustments in the real world. It is more messy than a mere instantaneous adjustment summarised by a Marshalian 'cross' diagram. The players are "naturally prompted" by changes in "effectual demand" to adjust their behaviours to reconcile "natural prices" to "market prices". But seamless or tidy it is not; messy may be the norm.

Smith does not expand on the necessary complications of time lags. He is more concerned with outlining the mechanism by which 'natural' and 'market' prices are reconciled, broadly, by suppliers acting indvidually, idealy to bring about "that precise quntity" which "may be sufficient to supply, and no more than supply, that demand" (WN I.vii. 16: 75). From this point he paints in the real world complications as buyers and sellers imperfectly co-ordinate their actions.

He discusses the variations in the quantities produced in different years (WN I.vii.17: 75) and their "fluctuating" effects on "natural prices", especially that part of the components' influences on "wages and profits" and such fluctuations as affect both the values and rates of wages, "raising" them when "understocked" or falling when "overstocked" with labour, or "sinking" of wages that change "prices" (WN I.vii.18: 76).

Crucially, writes Smith, introducing the "gravitating" metaphor: *"the market price of every particular commodity is in this manner continually gravitating, if one may say so, towards the natural price, yet sometimes particular accidents, sometimes natural causes, and sometimes particular regulations of police, may, in many commodities, keep up the market price, for a long time together, a good deal above the natural price*" (WN I.vii. 20: 77).

From what Smith had written so far, his choice of the "gravitation" metaphor certainly "describes in more striking and interesting manner" its object, namely the way in which market prices seem to oscillate about changing natural prices, which are the component prices upon which potential suppliers of marketable goods sluggishly base their decisions to supply products to markets (WN I.vii.1-21: 72-77). Buyers there and then can buy more or buy fewer of the goods in the market, but sellers adjusting to the prevailing effectual demand may take longer time to adjust their supply. Moreover, in the following chapters from WN (I.vii to I.v1.p), Smith discusses the many circumstances that can affect the reconcilliation of 'sellers' and 'buyers' changing offer prices.

Market-day prices could change according to changes in the composition of buyers during any particular market day. If the seller earned more than the natural price she earned extra profits over her initial 'natural' costs of the products she brought to market for sale. Market prices are decided by reconciling fluctuations in price offers and their acceptability to players seeking to buy the sellers' products in bargaining processes (weakly in parallel, so to speak, as planetary and other moving inter-planetary objects, such as meteors, comets, and space debris, with mass, move in their orbits, or in their velocities). In markets, changes in the "effectual demands" of buyers can cause changes in market buying prices, and changes in sellers' costs can cause changes in sellers' selling prices, or more correctly, perceived changes in the variables affecting prices that may provoke changes in buyers and sellers' perceptions of their prospects of settling their transactions at earlier perceived prices and how likely new current prices might affect their chances of finding partners willing to settle their transactions on mutually favourable, or on least damaging, terms.

Sellers depend, as do buyers, on their skills at bargaining and persuasion, as outlined in WN (I.ii: 26-7) and in TMS, where Smith discusses discords and concords between humans in their relationships (cf. TMS, 16; 19; 21; 23; 25; 42) as they try to obtain what they want by "addressing the self-interests/self-love" of those with whom they higgle and haggle. Smith explained this as an interactive, two-way process, his meaning of which is often neglected:

"*But man has almost constant occasion for the help of his brethren, and it is in vain for him to expect it from their benevolence only. He will be more likely to prevail if he can interest their self-love in his favour, and shew them that it is for their own ad- vantage to do for him what he requires of them. Whoever offers to another a bargain of any kind, proposes to do this. Give me that which I want, and you shall have this which you want, is the meaning of every such offer; and it is in this manner that we obtain from one another the far greater part of those good offices which we stand* *in need of. It is not from he benevolence of the butcher, the brewer, or the baker, that we expect our dinner, but from their regard to their own interest. We address ourselves, not to their humanity but to their self-love, and never talk to them of our own necessities but of their advantages*" (WN I.ii.2: p 26-7).

The self-interested seller is not immune to the specific market conditions prevailing at any one moment and neither are self-interested buyers. Self-interested participants in markets are in a mutually-influenced regular or temporary transactional relationship. To argue, as many do, that self-interested sellers and/or buyers act in markets in pursuit of their own narrowly focussed self-interests and are somehow at the same time immune to the self-interests of those with whom they attempt to bargain is one of the crassist assertions of those (many) modern economists who narrowly interpret Smith's writing on bargaining (WN I.ii. 2-3: p. 26-7), should they consider it. Moreover, it is contrary to the experience of anybody who has bought or sold anything in markets that operate in the real world, or, as I often observe, argued over their budgets in every university department that I worked in or visited from 1972-2005.

Buyers and sellers function in the real world by mediating their separate self-interests to achieve most, or some, of what they want from their bargaining partners in exchange for them negotiating partners getting most, or some, of what they want in exchange. That is why Smith advised buyers seeking to "prevail" in their quest for the ingredients for their dinners, from that now famous everyday-trio, of the "butcher, brewer and baker" to *"interest [the sellers'] self-love in his [the buyers'] favour, and show them [the sellers] that it is for their own advantage to do for him [the buyer] what he requires of them" and "never talk to them [the sellers] of their own [the buyer's] necessities but of their [the seller's] advantages*" (WNI.ii.2: pp 26-7; square brackets added to clarify Smith's intended meaning).

Commercial bargaining exchange interactions occurred in multiple locations across the classical world until the disruptions caused by the fall of Rome in the 5th century, when 'barbarian' warlords over-ran Northern Europe. Centuries later their descendants became landlords with feudal titles, awarded by powerful local feudal kings. From the 14th century, tiny hamlets and villages grew slowly into small towns with settled market places for traded products which slowly developed from the increasingly evident divisions of labour practised by 'free' labourers and merchants, who served the countryside around them. Increasingly, these bargaining exchanges shipped expanded the growth in trade in the "necessities, conveniences and amusements of life” to and from distant neighbourhoods and foreign countries for sale to the richest landlords.

Gravity is the ever present force that operates on all planetary and solar systems, eternally changing in space and over the long run. Our own galaxy is approaching and similtaneously is being approached by a neighbouring galaxy that at some moment in the distant future will collide with ours, upsetting currently steady gravitational attractions and repulsions. Similarly, though infintely quicker, with ‘natural’ and ‘market’ prices! They shift around regularly, causing buyers and sellers to re-evaluate their expectations and their potential options for exchanging what they have for what they want in exchange.

In Smith’s context in WN I.vii, the ‘gravitation’ metaphor “describes in a more striking and interesting manner” the interactions between the many sellers and buyers of products at “natural prices” (costs including normal profits) that may or may not be realised in actual markets in a future marketing period. When ‘effectual demand’ does not realise ‘natural’ prices, because of conditions in the local economy that cause changes in buyers’ behaviour and ‘market’ prices cause changes in suppliers’ behaviour, those adjustments are not necessarily captured in the standard, static Marshallian S-D diagrams.

Smith's literary descriptions necessarily are a trifle verbose when he discusses the complex interactions from ever changing 'market' prices that may not clear instantly at any particular price. Smith attempts to describe the resulting interacting-changes from "different accidents", when sometimes 'market' prices are "suspended a good deal above" and sometimes they are forced "even somewhat below" 'natural' prices. By using 'gravitation' as a metaphor, Smith was able to describe "*whatever may be the obstacles which hinder them from settling in this center of repose and continuance, they are constantly tending towards it*" (WN I.vii.15: 75). Therefore, I suggest that Smith's use of the 'gravitation' metaphor to describe the connected relationship of two the variables of 'natural' and 'market' prices in these several paragraphs show that he did so in a "more striking and interesting manner" (Smith, LRBL, p. 29). He was, as his friend and colleague, Hugh Blair, put it, using a metaphor in "*a more lively and animated manner*" to express "*the resemblances which imagination traces among objects. There is nothing which delights the fancy more, than this act of comparing things together, discovering resemblances between them, and describing them by their likeness. The mind, thus employed, is exercised without being fatigued; and is gratified with the consciousness of its own ingenuity*" (Blair, 1787, pp. 372-3).

Similarly, the editors of the Glasgow edition of WN include a footnote to show that Cantillon (1755) used a different but excellent and indirect gravity metaphor to describe what amounts to the ‘natural’ and ‘market’ price relationship by referring indirectly to gravity as a 'perpetual ebb and flow in market prices’ and their ‘invarying intrinsic values’ around what Smith called their ‘natural price’ (see Cantillon, R. 1734, 1755. *Essai sur la nature du commerce en General,* I.x: p. 31.). The motion of the tides are, of course, indirecly related to the *gravitational* attraction of the the Moon as it orbits the gravitational pull of the Earth. Is this a coincidence of Cantillon’s and Smith’s thinking or a prompt from one to the other? What is most likely, if not certain, is that both authors expected their readers to read the metaphor’s applicability in purely rhetorical terms and not as classical Aristotle or Empedocles, or Newtonian philosophical distinctions.

Moreover, in the chapters in WN that follow Smith’s use of the gravitation metaphor he goes into some considerable detail to show many of the complicating influences on the prices of labour that make market prices differ from natural prices where there is ‘perfect liberty’, related to the actual situation normally prevailing in market economies as known to operate in the 18th century in the absence of ‘perfect liberty’.

David Andrew's original thoughts of the philosophical distinctions between Newtonian, Empedoclean and Aristotelian gravity are not needed to illustrate Smith's remarks in the connected movement of 'market' prices, under and above 'natural' prices by using a rhetorical metaphor to support his description of them. David Andrews' references to the interpretations of some modern authors of the gravity metaphor while possibly useful as an exercise for specialist readers, it detracts, but does not replace or improve on Adam Smith's teachings on the role of metaphors, including the 'gravity' metaphor, as "describing in a more striking and interesting manner" their 'objects', which it does admirably as Smith used it.

Further Thoughts by David Andrews

David Andrews links his discourse to the evident purposes of nature, especially the propagation of the species, shared by humankind and all manifestations of life on Earth. This is interesting and would attract readers' attention on its own merits. The supplier of products of labour, both her own and those she hires for wages, are not passive agents in markets, such as mere price-takers. She is an active player and is prompted to act by her experience of whether she receives the natural price (as defined by Smith) or not, according to the way in which market prices tend to move, for the reasons that Smith discusses in WN.

Andrews quotes from Smith's 'Lectures on Jurisprudence' (1762-3, 1980), which Smith drew upon when he illustrated the same points in WN. In my view, Smith's earlier expositions of thoughts often appear somewhat clearer in his student's verbatim text of Smith's lectures (LJ, 1978), compared to when he expressed the same ideas 13 years later in his published text (WN, 1776). For exmple:

"*This division of work is not however the effect of any human policy, but is the necessary consequence of a natural disposition altogether peculiar to men, viz the disposition to truck, barter, and exchange; as this disposition is peculiar to man, so is the consequence of it, the division of work betwixt different persons acting in concert*" (LJ B v1.45: p. 347).

and

"*Man continually standing in need of the assistance of others, must fall upon some means to procure their help. This he does not merely by coaxing and courting; he does not expect it unless he can turn it to your advantage or make it appear to be so. Mere love is not sufficient for it, till he* *applies in some way to your self-love. A bargain does this in the easiest manner. When you apply to a butcher for beer or for beef you do not explain to him how much you stand in need of these, but how much it would be [in his] interest to allow you to have them for a certain price. You do not address his humanity, but his self-love*" (LJA vi.45-6, pp. 347-8; cf. WN I.ii.2: 26-27).

Exchanges between suppliers to market and buyers in markets are active and not merely passive. They are speech-laden, not silent, and what is said affects the participants and often leads to subsequent actions by them, and these actions have both intended and unintended consequences affecting behaviours at future markets that in turn affect actual prices and actual exchanges. Markets tend to be noisy, not silent or passive affairs. Market prices rise and fall as do tolerated natural prices. Both market and natural prices influence each other, as do the conversations between sellers and buyers and their consequential actions.

I can agree with David Andrews that: "*These prices, independent of the deviation of market prices from natural price and the gravitation-like adjustment process, are equal to costs of production, but involve something more than simply cost of production. They contribute to the feeding, re-*

production, and continuation of humanity". I also note, without a strenuous objection, David Andrew's use of a simile - *'gravitation-like adjustment process*' - as an acceptable figure of speech, rather than Smith's pure metaphoric purpose of writing "*gravitating, if one may say so, towards the natural price*". Our differences, such as they are, focus on the introduction of "Epidoclean" or "Aristotlean" or "Newtonian" gravity into a debate on metaphors in rhetoric that does not require these philosophical distinctions.

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[GK: 6/6/2014: gavinK9@gmail.com]