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Professor Barrie Pettman

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Exposure to pesticides, ill-health and averting behaviour: costs and determining the relationships

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Abstract

Purpose – Farmers' exposure to pesticides is high in developing countries. As a result many farmers suffer from ill-health, both short and long term. Deaths are not uncommon. Seeks to address this issue.

Design/methodology/approach – Field survey data from Sri Lanka are used to estimate farmers' expenditure on defensive behaviour (DE) and to determine factors that influence DE. The avertive behaviour approach is used to estimate the costs. Tobit regression analysis is used to determine factors that influence DE.

Findings – Field survey data show that farmers' expenditures on DE are low. This is inversely related to high incidence of ill health among farmers using pesticides.

Originality/value – The results of this study are useful, not only for Sri Lanka, but also for many countries in South Asia, Africa and Latin America in reducing the current high levels of direct exposure to pesticides among farmers and farm workers using hand sprayers. Farmers' exposure to pesticides is a major occupational health hazard in these countries.

Keywords Pesticides, Developing countries, Public health

Paper type Research paper

1. Introduction

Exposure to pesticides by farmers and farm workers in developing countries is common (Gupta, 2004; Sodavy *et al.*, 2000; Antle *et al.*, 1998). Frequent exposure to pesticides results in ill-health, both in the short and long term. Deaths are also not uncommon. In fact ill-health resulting from such exposure is a major health hazard in the agricultural sector in developing countries and the problem shows no signs of abatement (Maumbe and Swinton, 2003; Roberts *et al.*, 2003). Recent estimates cited by Food and Agriculture Organisation (2000) from Pesticide Action Network (PAN) show that approximately three million people are poisoned and 200,000 die from pesticide poisoning every year. The largest number of poisonings and deaths occur in developing countries. In finding a solution to minimise the incidence off ill-health it is important to determine whether farmers take adequate precautions and what factors influence the level of precautions taken.

Field observations and published work (Wilson, 1999) show that farmers' exposure to pesticides is high mainly because of the inadequacy of protective gear worn and "other precautions" taken. Field survey data[1] are used to examine to what extent precautions are taken by farmers while spraying on their farms. For this purpose the expenditures incurred on defensive behaviour (DE) are estimated using the avertive behaviour approach. The estimates show that the costs incurred are very low. The paper then identifies the factors that are likely to influence precautions taken. Field survey data are used to identify these variables using Tobit regression analysis.

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The remainder of the paper is set out as follows. Section 2 describes the background to pesticide use and the resulting health effects while Section 3 describes the DE approach and its usefulness for the study. Section 4 discusses the extent to which money is spent on DE and ill-health resulting from exposure to pesticides. The empirical evidence is discussed. Section 5 examines the factors influencing DE among farmers and Section 6 presents the Tobit regression results. The final section, Section 7 summarises and concludes.

2. Background to pesticide use and resulting health effects

Since the introduction of the green revolution technology in the 1960s, farmers mainly in South Asia have been using pesticides in increasing quantities. The green revolution technology involved using high-yielding varieties (HYVs) of seeds, pesticides and fertilisers in addition to irrigation. These inputs were part and parcel of the green revolution technology (Farmer, 1977). This technology was used mainly to boost wheat and rice. Since then the commercial cultivation of vegetables dependent on the use of pesticides have also increased, especially during the off-season when rice and wheat are uncultivated. The increased cultivation of vegetables has been made possible partly because HYVs have a shorter crop duration and are not suitable when irrigation is limited. Furthermore, the cultivation of these crops is more profitable if over production can be avoided.

The green revolution technology increased production and productivity of rice and wheat by many fold (Wilson, 2000). There has been a similar success with the growing of vegetables. As a result of increased food production South Asia has been able to avoid a Maltusian food crisis. However, there is a dark side to increased commercial food production and the introduction of new technology. Farmers have become increasingly dependent on chemical inputs such as pesticides and fertilisers to grow their crops. Pesticides are now used in increasing quantities to control the pests and diseases that easily attack HYVs of rice and wheat and vegetable crops. Today for example, almost all semi-subsistence farmers in Sri Lanka use pesticides (Wilson, 1999)[2]. Pesticides were not an option for many of the farmers in the 1960s before the introduction of this new technology and growing vegetables for a commercial market. In fact, many farmers in Asia and elsewhere who are using this technology and are involved in commercial agriculture are dependent on the use of pesticides. Data available from the 1970s show that the amount of pesticides (insecticides, herbicides and fungicides) used in Sri Lanka have increased from 59 metric tones in 1970 to 6,742 metric tons in 1995 which is a percentage increase of 11, 327 per cent (Wilson, 1999). Available FAO data also shows that the quantity of pesticides used in some countries is still increasing (FAO, 2005). Furthermore, field survey data collected in Sri Lanka (Section 4 shows the details of survey) show that farmers use a variety of pesticide brands and the quantities used are also large (Wilson, 1999). This is shown in Table I.

Table I shows that insecticides are the most frequently used pesticides. They are used for the control of insects and they are the most toxic of all pesticides used. Most of the insecticides used in the study area were organophosphates and carbamates and to a lesser extent organochlorines. These pesticides are known to be toxic to humans, wildlife and the environment (Wilson and Tisdell, 2001). Table II also shows the quantity of pesticides used by an average farmer in the study area. It is around 356 ounces per farmer per year. In other words, a farmer uses more than 22, 16 ounce

bottles of pesticides a year, most of which are insecticides. Similar high levels of pesticide use have been reported in other countries (Maumbe and Swinton, 2003; Antle *et al.*, 1998). In spraying these pesticides, farmers are often directly exposed to these chemicals and some for as long as six hours in Sri Lanka. Long hours of spraying have been reported in other countries as well. Owing to the nature of farming (mainly small scale agriculture) in developing countries, pesticide spraying is undertaken manually using hand sprayers. Hence the level of direct exposure is very high which results in high levels of morbidity and even mortality among the farmers. A breakdown of the average handling and spraying hours is shown in Table II.

Table II shows that an average farmer handles and sprays pesticides for more than half a working day on his farm on a typical spraying day. The frequency of use varies from one spraying day a month to as much as two spraying days a week during the peak of the cultivating season. The frequency of use can vary greatly from crop to crop and season to season. On average, a farmer handles and sprays pesticides for around 197 hours a year (Wilson, 1999).

In using these pesticides, farmers take some form of precaution to avoid direct exposure to pesticides. However, such measures are usually found to be inadequate (Maumbe and Swinton, 2003; Sodavy *et al.*, 2000; Wilson, 1999). A breakdown of precautions taken is shown in Table III for farmers in Sri Lanka.

Table III shows that in the sample group, approximately 34 per cent of the respondents said that they wear some form of protective clothing when spraying pesticides, 31 per cent wear masks and 44 per cent wear gloves. Very few farmers were found to wear shoes. A farmer at a given time can take one or many of the precautions shown in Table III. Farmers using special storage facilities were very low. Approximately 29 per cent of the farmers incurred costs in taking "other precautions" such as hiring labour in order to protect them from direct exposure. Often, this was done on grounds of medical advice or when having to spray for long hours. Seventy

Table I.
Number of brands and quantity of pesticides used per year in five study areas of Sri Lanka

Pesticides	Number of brands	Average use of pesticide brands
Insecticides	48	2.82
Herbicides	27	1.11
Fungicides	28	0.99
	Total use	Average use
Ounces	72,330	356.30

Source: Wilson (1999); details of the survey are reported in Section 4 of the paper

Table II.
Handling and spraying exposure to pesticides on a typical pesticide spraying day in Sri Lanka

Direct exposure time	Average hours of a typical pesticide spraying day
Spraying hours per day	5.71
Handling and mixing hours per day	0.19
Total	5.91

Source: Wilson (1999); details of the survey are reported in Section 4 of the paper

percent of the interviewed farmers were found to take at least one of the precautions mentioned above. Such precautions taken, however, do not mean that they were adequate. Similar conclusions have been reached by Sodavy *et al.* (2000). Furthermore, almost all the spraying is done manually (by hand) due to the use of hand sprays and hence the direct exposure levels are even greater.

Pesticides, although designed to control pests and diseases, have several drawbacks. Farmers using them, when exposed become sick (Keim and Alavanja, 2001). The illnesses can range from headaches, skin rashes, nausea, twitching of muscles to chest pains and a host of other illnesses. Farmers as a result end up in hospital, take treatment from doctors or simply take home made remedies. The other negative effects include damage done to the environment and increasing resistance to pesticides by pests (Wilson and Tisdell, 2001). Furthermore, there are other consequences of dependence on pesticides such as lock-in aspects which are discussed in Wilson and Tisdell (2001).

Many field studies and secondary data worldwide confirm illnesses and deaths resulting from exposure to pesticides (Maumbe and Swinton, 2003; Wilson, 1999; Antle *et al.*, 1998). Secondary data in Sri Lanka show that at least 15,000 farmers take treatment from government hospitals every year (Sri Lanka Annual Health bulletins, 1985-2001). Field surveys also show that large numbers of farmers suffer from some form of sickness due to exposure to pesticides while handling and spraying (Wilson, 1999). Secondary data also show that deaths are not uncommon (Sri Lanka Annual Health Bulletins, 1985-2001). However, this data should be interpreted with caution. This is because not all hospital admissions and deaths are due to occupational poisoning (i.e. handling and spraying on the farms); they also include cases of self-ingestion (suicides), accidental ingestion, and homicides (Roberts *et al.*, 2003).

When farmers suffer from ill-health due to exposure to pesticides they incur many private costs (in addition to public costs), both tangible and intangible. Some of the tangible costs are as a result of consulting private doctors when public hospital care is unavailable or not desired, purchasing drugs, due to loss of working days on their farms, time spent on seeking treatment, hiring labour when sick, loss of efficiency on farms, leisure time losses and long term costs.

In addition, farmers take precautions to avoid exposure to pesticides. In this case, too, farmers incur costs. They include purchasing protective clothing, masks, gloves, shoes, building special storage units and taking other preventative measures (e.g. hiring labour). It is important to estimate these costs for several reasons. One reason is to see whether farmers take adequate precautions. Costs incurred on purchasing

Table III. Protective items and percentage of farmers taking precautions in Sri Lanka in the study areas

Protective item	Percentage
Wearing protective clothing	34.48
Wearing masks	31.52
Wearing gloves	44.33
Wearing shoes	4.43
Building special storage units	5.41
"Other precautions" taken (e.g. hired labour)	28.57

Source: Wilson (1999); Details of the survey are reported in Section 4 of the paper

protective gear and "other precautions" is a reasonable indicator of preventative measures undertaken. It is well documented that there is a relationship between costs incurred on avertive behaviour and ill-health resulting from exposure to pesticides. This is because if the DE is high then it is expected that the exposure would be low and hence the ill-health resulting from such exposure. This can be shown as follows.

Consider the following contingent valuation (CV) willingness to pay equation (WTP) to avoid exposure to pesticides:

$$\mathrm{WTP} = w\frac{\mathrm{d}S}{\mathrm{d}P} + \frac{\mathrm{d}M}{\mathrm{d}P}Q_{\mathrm{M}} + \frac{\mathrm{d}D}{\mathrm{d}P}Q_{\mathrm{D}} - \frac{U_{\mathrm{S}}}{\lambda}\frac{\mathrm{d}S}{\mathrm{d}P} \tag{1}$$

The equation shows that the CV WTP can be written as the sum of the value of lost time $\mathrm{w}(\mathrm{d}S/\mathrm{d}P)$ plus the observed changes in mitigating (e.g. medical) expenditures, $Q_{\mathrm{M}}(\mathrm{d}M/\mathrm{d}P)$, plus defensive expenditures, $Q_{\mathrm{D}}(\mathrm{d}D/\mathrm{d}P)$, and the disutility resulting from illness $(\partial U/\partial S)(\mathrm{d}S/\mathrm{d}P)/\lambda$ where $\lambda = 1/\mathrm{m}$, the marginal utility of income (INC), converts the disutility of illness $\partial U/\partial S$ into monetary values. This implies that when the defensive measures undertaken are inadequate then the first two terms and the fourth term on the RHS of the equation will exist. On the other hand, if defensive measures undertaken to prevent total exposure are sufficient, then there will mainly be defensive expenditures. If defensive expenditures undertaken are small (inadequate) then the first two terms and the last term will be large.

3. Brief introduction to the avertive behaviour approach and its usefulness for the study

This approach can be used to show whether farmers take adequate precautions or not and to what extent these precautions are taken. Many studies have shown that the precautions undertaken are inadequate (Maumbe and Swinton, 2003; Sodavy *et al.*, 2000). This technique can reliably estimate the extent to which precautions are undertaken by farmers when using pesticides on their farms. Furthermore, the rest of the data collected from the survey can be used to determine what factors influence DE. This could explain, to some extent, the high levels of exposure by farmers. The use of the avertive behaviour approach was first discussed in a paper by Stevens (1966) in an article in Water Resources Research. Stevens (1966) considered the benefits of avoiding water pollution that would otherwise affect recreational fishing success. His main argument was that the quality of fishing was represented by the recreational fishing success per unit effort. Water pollution, it was argued, would affect recreational fishing success. He tried to show the benefits of water pollution control by estimating a demand function for the sport. Several studies have been conducted in the field of health economics because this is one of the most appropriate methods available for estimating costs related to precautions taken.

The avertive behaviour approach is based on the notion that any defensive expenditure incurred (including time) infers an individual's value for the subject in question. In other words, it can be interpreted as the willingness to pay to reduce or avoid ill-health. In using this technique all the direct and indirect costs associated with DE are considered. For example, any visits to the doctor (e.g. checkups), any medication taken in anticipation of any risks (e.g. medical care), the time spent on such

visits, any leisure foregone to devote time for DE, any protective gear used (such as masks used when spraying pesticides) and labour costs, are considered.

In avertive behaviour studies, it is important to determine the exact effectiveness of the DE being adopted. Only the costs of the DE that have specifically benefited the individual should be estimated. In some cases taking account of the DE accurately and adequately could be a problem. A good example cited by Cropper and Freeman (1991) is the use of an air conditioner to reduce the effects of air pollution. It was pointed out that the mere presence of an air conditioner in a home or a car is not an accurate measure of an individual's reduced exposure to air pollution because of the many joint benefits that an air conditioner can provide. Furthermore, in the case of spraying pesticides joint effects such as hiring people to spray pesticides, although reducing risks of exposure to pesticides can also give rise to more leisure and other benefits for the person hiring the workers. Therefore, it is important to take into account both joint products and substitutability of products. In other words, it is important to isolate the health benefits for which it was intended and thereby estimate only these costs.

4. Money incurred on defensive behaviour, ill-health due to exposure to pesticides: some empirical evidence

The data collected from a sample of 203 farmers surveyed in Sri Lanka in the summer of 1996 are used. Five areas were sampled from the intermediate dry zones of Sri Lanka where intensive agriculture is widespread. The regions covered were Yatawatte, Kandalama, Beligamuwa, Ambana and Polonnaruwa in the Central and North Central provinces of Sri Lanka, within a 75-100 mile radius. Only farmers who were regular pesticide users and cultivate land not less than half an acre and not more than three acres were selected, because according to a census conducted in 1982 by the Department of Census and Statistics, Sri Lanka, the average farm size was 1.94 acres. Therefore, as the census statistics show, a large number of farmers cultivate a land area which is less than 3 acres and more than half an acre. The five regions selected specialise in growing various food crops. As a result, the level and intensity of pesticides used and the level of exposure to pesticides vary from region to region. Judgment sampling was employed to collect the necessary data for the study. Prior to the interviews, a pilot study was conducted to determine the viability of questions prepared to collect the necessary data. The questionnaire was modified, removing questions that proved difficult to administer. From the data collected the average DE costs are estimated.

The survey revealed that 61 per cent of farmers interviewed had incurred some form of expenditure on protective gear and 32 per cent on other DE. The survey also revealed that 70 per cent of the interviewed farmers incurred costs in wearing protective gear as a well as taking "other precautions". However, they were inadequate. Similar results have been observed in other studies (Sodavy *et al.*, 2000). The survey results are shown in Table IV.

Table IV also shows a breakdown of the extent of precautions taken by the interviewed farmers in the five study areas. As can be seen there is considerable regional variation in the costs incurred ranging from 97 (Ambana) to 47 per cent (Yatawatte). It is interesting to note that Ambana is one of the areas with high pesticide use due to intensive vegetable cultivation. In this area spraying takes place every 2-3 days. However, the extent of "other precautions" taken is low for all the study areas.

Since many studies (Maumbe and Swinton, 2003; Sodavy *et al.*, 2000; Sivayoganathan *et al.*, 1995) show that the amount of precautions taken is inadequate it is important to determine how much farmers spend on DE. One way of ascertaining whether the precautions taken were adequate is to calculate the costs of the protective gear used and "other precautions" taken. To estimate the costs the prevailing market prices were used. The amount of money spent on each protective item and "other precautions" taken during a 12 month period are shown in Table V.

Table V confirms that the average cost of precautions taken to reduce direct exposure in the five surveyed regions is low. It was only 405 rupees per year. This amounts to approximately $7[3] a year, yet constitutes around 12 per cent of an average farmers monthly INC in Sri Lanka. The INC was approximately 4,748 rupees (US $86). There is considerable regional variation in per capita defensive expenditure ranging from 46.45 (Polonnaruwa) to 1,079 rupees (Ambana). However, costs incurred are very low. This explains why farmers in Sri Lanka suffer from high levels of ill-health. Table VI shows some of the common illnesses affecting farmers when exposed to pesticides on a typical pesticide spraying day.

Table V shows that although farmers spend more than 10 per cent a year of an average farmers monthly INC it is not adequate because they suffer from several acute symptoms on a typical pesticide spraying day (Table VI). The columns in Table VI show the percentage of respondents (farmers) affected. The numbers from 1 to 6 in boxes show how often the respondents were bothered by the illnesses shown in the left-hand side column of the table. A farmer can suffer from any one or more of these illnesses. The health effects range from feeling faint to blurring vision and tremors

Table IV. Percentage of respondents incurring costs on defensive behaviour to avoid exposure to pesticides in the study area

	Beligamuwa	Ambana	Kandalama	Yatawatte	Polonnaruwa	Total
Respondents (in percentage)	42	31	46	53	31	203
Defensive costs (percent)						
PC	48	97	69	47	51	61
OC	10	29	46	49	10	32
All	52	100	69	75	55	70

Notes: PC: number of respondents incurring costs on some form of protective gear; OC: number of respondents incurring costs apart from costs on protective gear (for example, costs incurred on special storage and hiring labour); ALL: includes all respondents incurring costs on protective clothing and other defensive behaviour

Table V. Costs of precautions taken to reduce direct exposure to pesticides

Protective item	Total cost (Rs)	Average (Rs)
(1) Wearing protective clothing	26,745	131.74
(2) Wearing masks	4,189	20.63
(3) Wearing gloves	3,900	19.21
(4) Wearing shoes	445	2.19
(5) Building special storage units	10,075	49.63
(6) "Other precautions" taken (e.g. hired labour)	36,890	181.72
Total	82,244.5	405.14

	1	2	3	4	5	6
			Per cent			
Illnesses recorded on a spraying day						
Faintish feeling	19	05	03	05	38	36
Headache	20	09	04	12	24	19
Dizziness	16	07	06	08	23	37
Nausea	13	07	03	04	23	51
Excessive salivation	44	10	01	06	14	26
Eye irritation	09	07	02	04	10	66
Eye tearing	07	01	01	06	14	77
Vomiting	02	0.4	02	06	25	69
Weakness of muscles	12	03	02	03	11	67
Difficulty in breathing	06	04	02	03	13	70
Twitching of eye lids	05	03	00	04	06	91
Cramps	06	03	02	03	07	86
Diarrhea	00	0.4	00	01	01	12
Twitching of muscles in the face	08	05	01	04	04	75
Twitching of muscles in the body	20	05	02	03	12	55
Blurring vision	08	04	02	03	07	74
Tremor	18	02	01	04	18	71

Notes: 1: every day; 2: almost every day; 3: about half of the time; 4: now and then, but less than half of the time; 5: rarely; 6: not at all

Table VI. Frequency of illnesses affecting farmers on a typical pesticide spraying day

(Table VI). These are the usual acute symptoms which appear on spraying days. Similar symptoms appear on non-spraying days as well (Maumbe and Swinton, 2003; Wilson, 1999). Chronic, long-term health effects range from chest pains, blindness, loss of memory, ulcers, depression and various cancers (Maumbe and Swinton, 2003; Keim and Alavanja, 2001)[4].

The illnesses shown in Table VI is a cost to farmers. Table VII shows the percentage of farmers incurring costs as a result of these illnesses during a 12 month period.

Table VII shows that on a typical spraying day or soon afterwards (usually within four hours), 20 per cent of the farmers interviewed had been admitted to hospital and incurred costs, 30 per cent had taken treatment from a doctor and incurred costs and another 64 per cent, although they were not hospitalised or did not require treatment from a physician took home made self-treatment and incurred other private costs. Furthermore, 42 per cent of the respondents incurred costs on non-spraying days and 35 per cent incurred costs due to long-term illnesses resulting from direct exposure to pesticides. Approximately 96 per cent of the interviewed farmers said that they suffered from some form of acute illness and incurred costs during a 12-month period. The costs to farmers have been estimated to be between 273 and 1,639 million rupees (Wilson, 2002). High levels of costs have also been reported by Maumbe and Swinton (2003). The high costs show that low levels of expenditure do not provide adequate protection. In other words it is a waste of farmers' limited financial resources when the precautions taken are inadequate (Equation (1)).

Furthermore, although the defensive costs incurred by an average farmer is low, it runs into millions of rupees when aggregated among all the farmers who use pesticides. This is shown in Table VIII.

Table VII. Percentage of respondents incurring costs due to pesticide pollution in the study area

	Beligamuwa	Ambana	Kandalama	Yatawatte	Polonnarua	Total
Respondents	42	31	46	53	31	203
Medical costs (per cent)						
A	30	19	17	15	19	20
B	21	13	50	41	13	30
C	78	97	43	47	90	64
NSD	50	45	73	26	13	42
LTC	21	22	50	47	23	35
E P	100	100	100	92	87	96

Notes: A: respondents admitted to hospital and incurring private costs (includes all costs associated with pesticide pollution); B: respondents consulting a doctor and incurring private costs (includes all costs associated with pesticide pollution); C: respondents not admitted to hospital or consulting a doctor, but seeking some form of treatment and incurring private costs (includes all costs associated with pesticide pollution); NSD: all private costs incurred on non-spraying days due to exposure to pesticides (includes costs on medicine, consultation and other costs); LTC: all long-term private costs incurred due to direct exposure to pesticides (includes costs on medicine, consultation and other costs); EP: number of respondents suffering from acute illnesses described in the interview on a typical pesticide spraying day (excludes non-spaying days and long-term illnesses) and incurring costs. There were eight respondents in the sample ($n = 203$) who did not incur any costs; it is possible that a farmer may experience any two or more of the above mentioned costs in a given year

Table VIII. Defensive cost scenarios to reduce direct exposure to pesticides by farmers in Sri Lanka

	Cost scenarios			
Protective item	A	B	C	D
(1) Wearing protective clothing	6,587,000	13,174,000	19,761,000	39,522,000
(2) Wearing masks	1,031,500	2,063,000	3,094,500	6,189,000
(3) Wearing gloves	960,500	1,921,000	2,881,500	5,763,000
(4) Wearing shoes	109,500	219,000	328,500	657,000
(5) Building special storage units	2,481,500	4,963,000	7,444,500	14,889,000
(6) Others (e.g hired labour)	9,086,000	18,172,000	27,258,000	54,516,000
Total	*20,257,000*	*40,514,000*	*60,771,000*	*121,542,000*

Note: The average cost of defensive behaviour per protective item shown above (Wilson, 1999) are multiplied by the number of farmers whom we believe are affected by direct exposure to pesticides. We believe between 50,000 and 300,000 farmers are affected. Accordingly, we prepare the scenarios as follows: scenario A = 50,000 farmers, scenario B = 100,000 farmers, scenario C = 150,000 farmers, scenario D = 300,000 farmers

No one in Sri Lanka is certain how many farmers use pesticides. Assuming 100,000 farmers use pesticides, the costs of DE is approximately 40 million rupees a year. If it is 300,000 farmers it is more than 121 million rupees a year. Furthermore, low costs of DE by farmers also mean higher levels of ill-health (Equation (1)). Ill-health incurs large costs, both direct and indirect as shown by Maumbe and Swinton (2003) and Wilson (1999).

Hence, when farmers take low levels of precautions they incur costs due to ill-health as well as costs arising from purchasing protective gear and "other precautions" taken. The costs run into millions of rupees every year. These are both private and public

costs. These costs are large for developing countries such as Sri Lanka which they can ill afford. Long term costs arising from exposure to pesticides are another issue.

Since the farmers' levels of exposure and the costs are high it is important to reduce the current high levels to save farmers' lives as well as money for farmers and the country. In order to rectify this situation it is important to examine what factors influence DE so that such knowledge can be used to increase the level of precautions taken. It is hoped that this can substantially reduce the high levels of casualties. Otherwise, farmers will continue to spend more than ten per cent of a month's INC per year and yet have little impact on the incidence of ill-health resulting from exposure to pesticides.

5. Factors influencing defensive behaviour among farmers

It is possible to use the survey data to identify factors that influence DE among farmers. For this purpose Tobit regression analysis is used. Many factors have been cited as influencing DE by researchers such as Maumbe and Swinton (2003), Keim and Alavanja (2001), Sodavy *et al.* (2000), Antle *et al.* (1998) and Sivayoganathan *et al.* (1995). They include the level of education (EDU), availability and affordability of protective gear, availability of repair facilities, awareness of harmful effects of pesticides used, type of crops cultivated (CROP), methods of application, types of pesticides used (TPEST), acreage sprayed (ACRE), frequency of pesticide use (FOPU), prevailing temperature during pesticide spraying, government support to purchase protective gear, extension services provided by government agencies and cultural and environmental factors.

Although all of the above factors could influence the extent of precautions taken by farmers when spraying pesticides it is not an easy task to collect all the relevant data. However, data collected for seven variables during the survey are used. The variables for which data are available are EDU, yearly INC, CROP, FOPU, TPEST, whether or not farmers have read "instructions and warnings" on the bottle and acres sprayed (ACRE) for a year. The dependent variable in the regression analysis are the costs incurred on DE. The costs are used as a proxy for DE.

Costs incurred on DE are taken to represent the level of precautions taken which is written as a function of EDU, yearly INC, amount of CROP, FOPU, TPEST, farmers reading instructions and warnings on the pesticide bottle (RW) and ACRE in a year. As the signs indicate (Equation (2)), it is expected that the higher are the years of EDU, higher would be the level of precautions taken. Furthermore, it is hypothesised that higher is the level of INC, better would be the precautions taken. It is also hypothesised that the larger are the number of crops cultivated[5], the higher would be the precautions taken. In addition the more frequently are pesticides used, the higher are the chances of using protective gear. Also when a larger number of pesticide types are used, the higher would be the level of expenditures on precautions taken. It is also assumed that the more a farmer reads warnings on the pesticide bottle, higher would be the use of protective gear. Finally, we hypothesise that the larger is the ACRE, the better would be the precautions taken.

Guided by the data collected from the field survey and research work (Maumbe and Swinton, 2003; Sodavy *et al.*, 2000; Antle *et al.*,1998; Sivayoganathan *et al.*, 1995; Forget, 1991; Jeyaratnam,1982), the following specification was developed for a Tobit regression analysis. The data have been transformed into yearly figures and normalised into per capita terms.

$$\begin{array}{ccccccc} \mathrm{DE} = \mathrm{f}(\mathrm{EDU}, & \mathrm{INC}, & \mathrm{CROP}, & \mathrm{FOPU}, & \mathrm{TPEST}, & \mathrm{RW}, & \mathrm{ACRE}) \\ + & + & + & + & + & + & + \end{array} \tag{2}$$

The expected signs of the partial derivatives are shown beneath each argument in the function. The means and standard deviations for all the variables that were included in the regression analysis are shown in Table IX.

The mean precautionary costs are only 405.14 rupees per year which is wholly inadequate by any standard, especially when the intensity of pesticide spraying by these farmers is taken into account (Tables I and II). Hence, it not surprising to see the high levels of morbidity and mortality rates among farmers and the high costs associated with ill-health as discussed in Section 4. The ACRE per year by an average farmer is 45, which is more than half an acre per week. A large number of farmers had read warnings (RW) in the pesticide bottles about the dangers of handling and spraying pesticides and the mean was as high as 0.92. The mean FOPU is 33 where approximately five (4.94) pesticides a year are used on almost three crops (2.7). The average level of INC per year is 56,978 rupees with almost eight years of schooling.

Tests performed showed some degree of heteroscedesticity as can be expected in cross sectional data. Many solutions have been suggested to overcome this problem and they include using logs or semi logs, taking the square roots or reciprocals of the variables (Bryman and Cramer, 1997). Since there are a few respondents who have not suffered any illnesses and hence they have not incurred any costs, it was not possible to use semi logs. The alternative was to take the square root transformation of the dependent variable. This minimised the heteroscedesticity problem and also improved the goodness of fit. The "tolerances and variable inflation factor and the collinearity diagnostics" for the variables showed that multicollinearity was also not a problem. A Tobit analysis is used because it is the more theoretically appropriate method when the dependent variable contains zeros. This is because the dependent variables are limited in their range (Amemiya, 1984):

$$\begin{aligned} y_t &= y_t^*, \quad \text{if RHS} > 0 \\ y_t^* &= x_t'\beta + u_t, \quad y_t = 0, \quad \text{otherwise} \end{aligned} \tag{3}$$

where y_t^* is a non-observable random variable.

Table IX. Variables that influence defensive behaviour

Variable	Description	Mean	Standard deviation	Min	Max
PC	Precautionary costs	405.14	815.00	0	5,060
ACRE	Acreage sprayed per year	45.29	39.67	6	280
FOPU	Frequency of pesticide use per year	33.29	17.98	6	92
INC	Yearly income	56,978.1	53855.01	2,400	360,000
TPEST	Types of pesticides used	4.94	2.32	1	12
EDU	Years of education	7.50	3.32	0	14
CROPS	Total number of crops grown	2.7	1.7	1	9
RW	Read warnings	0.92	0.26	0	1

6. Regression results

The results of the Tobit analysis of the 203 observations are presented in Table X. The goodness of fit is small, but is not uncommon for work of this nature (Brien *et al.*, 1994; Row and Chestnut, 1986). One of the reasons for this is because the data used are cross-sectional. For this regression analysis the results are interpreted for a one tailed test. The null hypothesis is $H0 : \beta = 0$ and the alternative hypothesis is, $H1 : \beta < 0$ or $H1 : \beta > 0$.

Many of the results are consistent with what was expected and has the correct signs. The EDU, CROP, FOPU, TPEST are significant. This means that the higher is the level of EDU, then better would be the amount of precautions taken. Furthermore, the more crops are grown (which includes crops that need regular pesticide spraying), the better are the precautions taken. Furthermore, the higher is the FOPU, higher would be the precautions taken and the higher are the TPEST, then better would be the precautions taken. The INC, RW and the ACRE variables are not significant. This is contrary to what would be normally expected (Equation (2)). The negative signs reported for these three variables are not surprising for subsistence farmers. When a farmer sprayed a larger acreage, what the results show is that he would be taking less precautions. This result is not surprising because given the inadequacy of precautions taken, as shown by the low expenditures on defensive activity, when a larger acreage is sprayed, then the precautions taken are less. Furthermore, a larger acreage sprayed means, larger is the wear and tear of the protective gear. It is also possible that when a larger acreage is sprayed per given day, the amount of precautions taken (such as gloves, masks, shoes worn) tend to be less because of the temperature prevailing in the region (which was more than 30 + °C). There is considerable discomfort in wearing protective clothing for long periods of time, especially in the tropical heat. This has been observed in other studies as well (Sodavy *et al.*, 2000; Sivayoganathan *et al.*, 1995).

Although the negative INC variable is inconsistent with what will normally be the case, this result is not surprising either. In the case of subsistence farmers, a marginal change in INC cannot be expected to have an impact on the precautions taken, simply due to the fact that the marginal change in INC is still below an average farmers expected level of INC that may cause him to devote more resources to defensive action. Hence, a marginal change in INC among subsistence farmers cannot be expected to

Variable	Coefficients	Standard error	$z = b/\text{se}$
ACRE	−0.064	0.032	−0.700
FOPU	0.191	0.070	2.359****
INC	−0.077	0.000	−1.291
TPEST	0.139	0.460	1.625*
EDU	0.120	0.305	1.820**
CROP	0.149	0.609	1.603*
RW	−0.051	3.791	−0.834
(Constant)	–	5.287	−0.557

Notes: $R^2 = 0.114$ adjusted; $R^2 = 0.082$; standard error = 14.07; $F = 3.58$; the asterisks ****, ***, **, *, indicate 1, 2.5, 5 and 10 per cent level of significance, respectively, for a one tailed test; 59 observations at zero; 144 non-zero observations; n=203

Table X. Regression results showing factors influencing defensive behaviour to reduce direct exposure to pesticides

increase the precautions taken against direct exposure to pesticides. The negative sign of "read warnings" (RW) variable may be because although farmers RW they do not often adhere to instructions and warnings due to many reasons such as not being able to understand the instructions, the prevailing humidity, inability to obtain adequate protective gear, cultural taboos, and many other factors as pointed out by Sodavy *et al.* (2000), Antle *et al.* (1998) and Sivayoganathan *et al.* (1995).

7. Conclusions

The paper shows the extent to which precautions are taken by farmers when handling and spraying pesticides on their farms. The average costs per year was approximately 12 per cent of an average farmers monthly INC. The costs are low by any standard. These costs and the costs arising from pesticide exposure related illnesses per year when combined are very large and exceed a farmer's monthly INC. When the intangible costs (e.g. pain, suffering, stress and discomfort) are also considered then the costs are bound to be larger. These costs demonstrate that farmers using pesticides incur large costs due to pesticide exposure related illnesses and it is imperative that these costs are reduced.

The regression results show that among subsistence farmers, the FOPU, EDU, number of CROP and the TPEST influence DE. The results also show that INC of the farmer is insignificant as well as the number of ACRE and the "read warnings" (RW) variables. An outcome of these variables is that (although insignificant), when farmers spray a larger acreage, then the level of precautions taken tends to decrease. This may be due to wear and tear of protective gear, prevailing high temperatures, being uncomfortable to use protective gear for long periods of time, and the inability to purchase more expensive protective gear that minimises the discomfort.

The regression analysis examined only some of the variables that are believed to have an impact on the precautions taken. Some very important variables such as cultural taboos, prevailing temperatures on the day of spraying, availability of suitable protective gear and many other factors that Maumbe and Swinton (2003), Keim and Alavanja (2001), Sodavy *et al.* (2000), Antle *et al.* (1998), Sivayoganathan *et al.* (1995), Forget (1991) and Jeyaratnam (1982) have regarded as important variables influencing DE were left out for lack of data. Inclusion of such variables to examine their effect on the level of defensive behaviour is necessary in future work. Finally the results of this study are useful for agricultural managers in South Asia, Africa and Latin America in their attempt to reduce the current high levels of direct exposure to pesticides among farmers.

Notes

1. Field survey data were collected by the author with the assistance of two trained research assistants from five agricultural regions in Sri Lanka during the summer of details of the survey are reported in Section 4 of the paper.
2. It is worth mentioning that semi subsistence farmers because of their land holding size use hand sprayers to spray pesticides as opposed to large scale farmers who spray pesticides from inside a tractor or by aircraft.
3. The exchange rate prevailing during the study period (June-September, 1996) was US$1 = 55 rupees (approximately).

4. These observations were made by farmers based on their perceptions of ill-health using pesticides which were confirmed by physicians. In the USA many studies have established these links. For example, see Blair and Zahm (1993) and Potti and Sehgal (2005).
5. This is because to spray different crops, the precautions taken are different. For example, to spray a vine more head gear has to be worn to prevent pesticide mist falling on to the head and face. Hence, the more crops a farmer sprays, the more likely it is that he will have to incur large costs on defensive behaviour because of the different precautions that have to be taken.

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Sustainable development and environmental accounting: the challenge to the economics and accounting profession

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Abstract

Purpose – The purpose of this paper is to examine the role of natural resources accounting in sustainable development. Natural resource accounting is important because the welfare of a nation measured in terms of gross domestic product (GDP) has several weaknesses.

Design/methodology/approach – This paper achieves this objective by identifying the present status, the constraints and the challenges for the economics and accounting professions.

Findings – The main weakness of GDP as a measure of development is that it does not take into account damages to environmental resources. However, the improvement of the concept to include environmental resource use is made difficult because of the difficulties of measuring environmental damage. The challenge to the economics and accounting profession is to ensure interdisciplinary collaboration, development of a framework to explicitly include the environment, development of credible valuation procedures for the environment, and inclusion of the various ethical positions advanced by various groups on the value of the environment.

Practical implications – Some headway has been made on these issues during the last decade but a major challenge still lies ahead in further improving these approaches so that sustainable development becomes an achievable goal.

Originality/value – This paper brings together diverse views and fusing them together providing a future path for research in environmental accounting to achieve sustainable development.

Keywords Environmental management, Social policy, Natural resources

Paper type Research paper

1. Introduction

The emergence of the concept of sustainable development (SD) which places considerable importance on the maintenance of natural resources, requiring mandatory inclusion of natural resource values has posed many challenges to those involved in accounting for the natural environment (Gray, 1992). Natural resources were assigned a very low profile in the early years of economic development despite their unique contribution to development. The European Commission's Fifth Action Programme on the Environment entitled "Towards Sustainability" calls for enterprises to:

- disclose in their annual reports details of their environmental policy and activities, and the effects thereof;
- detail in their accounts the expenses on environmental programmes and a clear definition of such expenses; and

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- make provision in their accounts for environmental risks and future environmental expenses (European Commission, 1992).

The same programs suggest that product pricing be based on a full-cost approach, including the use and consumption of environmental resources.

The system of national accounts (SNA) published by the United Nations Statistical office reflects opening and closing stocks and sources of increase and decrease. The limitations are that only assets that are exchanged in the market place such as forestry, agricultural land and subsoil minerals are included. The value used is the market asset value and when such values are not available, economic asset valuing principles such as the present values will be used. The Australian Bureau of Statistics is exploring ways of modifying national accounts to deal with natural resource issues initially developing "satellite accounts" dealing with specific resources. However, there is dissatisfaction over satellite accounts and many believe that the accounting profession should explore novel ways of estimating a single figure of environmental damage on economic growth. They suggest the construction of a green GDP, a formidable task due to a myriad of problems associated in their measurement. The accounting profession agrees that satellite accounts are not the answer to the ever worsening environmental problem.

In South Africa, some companies have considered eco-efficiency accounting, which in reality is accounting for the environment. Accounting for sustainability incorporates the equity aspects of the paradigm of eco-justice. This approach firmly introduces the triple minimum requirements of profit-people-environment into the accounting function. In order to contribute to environmentally sustainable development, a company will have to satisfy all three conditions. The incorporation of profit-people-environment into accounting introduces environmental externalities into an incentive based economic model (Nilsson *et al.*, 1998).

However, the development of national accounts from forming the basis of any approach to ecologically sustainable development in most countries in the short to medium term is not bright (Commonwealth Government Discussion Paper, 1990). There is still considerable progress that needs to be made before the environment becomes an integral reporting entity in national accounts as well as the progress reports of the multitude of business entities.

The objectives of this paper are:

- to examine briefly the nature of sustainable development;
- to examine the role of natural resources accounting in economic growth and development;
- to explore the present status of environmental accounting;
- to assess some important issues constraining the development of environmental accounting; and
- to identify the new challenges for the economics and accounting professions.

2. Sustainable development

Economists differentiate the concepts of growth (growth in material size) and development (improvement in organization without size change). Extant macroeconomic models, ignored the critical role of natural resources and the costs of

environmental damage. The economic system was treated as independent of the environment. Economic growth as presently understood is neither sustainable nor generalizable to all presently living people. Growth in the economy is always associated with changes in natural stocks such as degrading soil resources, destruction of other ecological functions and loss of species upon which humans' survival depends. The "growthist" ethic does not integrate exploitation of natural resources, nature of investment, and patterns of technological development and institutional changes.

The concept of SD came into prominence in the 1980s and was embraced by most countries as an appropriate form of development. SD recognises that present patterns of consumption of natural resources are not sustainable and that more benign forms of development are needed. SD rose into prominence with the publication of the Brundtland Report where SD was defined as development that meets the needs of the present without compromising the ability of the future generations to meet their own needs (WCED, 1987). Hicks (1946) drew a distinction between income and capital, defining income essentially as a sustained flow that leaves capital stock intact. According to Hicks "we ought to define man's income as the maximum value he can consume during a week, and still expect to be as well off as he was at the beginning. And if a person's receipts are derived from the exploitation of a wasting asset, liable to give out at a future data, we shall say that his receipts are in excess of income".

In agenda 21, SD was defined as "development that does not destroy or undermine the ecological, economic or social basis on which continued development depends". Pearce *et al.* (1989) wrote that SD has come to mean whatever suits the advocacy of the individual concerned. The use of numerous definitions of SD bears witness to the fact that the conceptual content of SD still remains contentious.

Two important variants of SD are weak and strong sustainability. Weak sustainability implies that, if the total stock of capital including ecological capital (natural capital) resources, which generates the flows of income is being depleted over time, then that income is not sustainable. Here, substitutability between natural capital and man-made capital is high, loss of ecosystems is not a major concern as long as society's total savings rate is high enough to compensate for reduction of natural capital and thereby produce sustainable welfare paths. Hence an economy can be considered sustainable if it saves more than the combined depreciation of natural and man-made capital. We can pass less environmental resources so long as we offset this loss by increasing the stock of man-made capital such as roads and machinery. We can compensate for fewer roads and factories by having more wetlands and forestry.

If substitution possibilities are limited, satisfying inter-generational equity requires safe-guarding natural capital and irreversibility is a major concern here and the costs will be enormous. This is "strong sustainability" which asserts that future generations should be endowed with the same amount of natural capital as the present generation. Two factors that support strong sustainability are uncertainty and irreversibility. The existence of uncertainty means that we are unsure of how a natural system functions; hence, substitution of man-made capital for natural capital is not realistic. Further, environmental resources are characterised by irreversibility; hence if mistakes are made it is not possible to correct them. These two features should make human beings more circumspect about giving up natural capital (Pearce and Turner, 1990).

Sustainability, however, is not without its critics. The most virulent criticism of SD can be seen in Willers (1994) who says "SD is one of the most insidious and

manipulable ideas to appear in decades, and because the multifaceted, global offensive to sell it is essentially unopposed, it is perceived as something of an axiom by the people, which has grossly exceeded the bonds of reasonableness and which is ancestral to hosts of environmental and social ills, long ago became the enemy of the natural world".

3. Accounting for environmental resources

The importance of environmental resources such as water, air, soil, and forests, etc. mean that they need be explicitly treated both at the macro- and micro-planning levels.

At the macroeconomic level, consideration of the natural environment is important for effective planning purposes. The inclusion of the natural environment in national accounts provides information on the use of natural resources in economic activities.

Natural resource accounting corrects the national income accounts by giving the balance sheet of natural resources, which records the quantity and value. This information is relevant for policy makers and resource managers in determining the rate of depletion of natural resources in an economy. This in turn provides policy prescriptions to minimise resource degradation. If monetary values of these resources are included in national income, it will provide a reliable guide to the performance of the economy. Formulation of sound macroeconomic policies will be facilitated when such explicit information is available.

From a microeconomic perspective, it is noted that business entities currently provide limited information, often devoid of environmental asset use, to restricted stakeholder groups. However, modern versions of legitimacy require that information be provided to the wider society. To achieve these wider objectives, business firms should go further to incorporate activities and the impact on the company on and its endeavours to protect its amenities and the environment. In other words, business-related externalities should be internalised by the firm. Comprehensive reporting of all aspects of the business, will improve resource allocation.

3.1 Macro perspective in natural resource accounting

3.1.1 GDP and natural capital. Traditionally, gross national product (GNP) or gross domestic product (GDP) is used as the main indicator for measuring economic development. The three main weaknesses in GNP for SD are that:

(1) it does not take into account environmental degradation;

(2) the natural resources are valued at zero; and

(3) repair and remedial expenditure such as pollution abatement measures, health care, etc. are counted as positive contributions to GNP.

Natural resources are not free gifts of nature, although there is no investment cost.

The GDP includes only market activities but non-market activities should be given equal standing and hence added to GDP. When we cut down old-growth forest to turn into furniture, it will be added to GDP but no deduction is made for the loss of the forest and other non-market benefits such as scenic majesty, water conservation and biodiversity. The same argument applies to other activities such as mining, agriculture, industrial production – all of which cause pollution and loss of natural capital. Man made capital is depreciated in all accounting procedures but natural

capital is not. Further, the cost of cleaning up damage to natural resources enters as an addition to national income.

A more appropriate measure for SD that includes inter-generational well-being and sustainable resource use is net national product (NNP). NNP is the sum of the social value of an economy's consumption and the social value of the real changes in its stock of capital assets, including manufactured capital and natural resource stocks. This definition combines the Simon-Haig definition of the ideal income tax base and Hicks's idea of income as the most that one can consume in a period so that he is no worse off at the end of it than at the beginning. At present when NNP is computed, the depreciation of physical reproducible capital is deducted, but not the depreciation of its natural resource stocks (Chisholm, 1992). Since only man-made assets are valued as productive capital whose drop in value is depreciated, a consumption level attained by reducing the stock of capital exceeds the sustainable level of income. Natural resources are not valued and losses are not debited against current income that may reduce future income earning possibilities. Depreciation of natural capital should be deducted to obtain the green GDP.

For resource-based economies such as Australia, estimates of macroeconomic relationships are seriously distorted by failure to account for natural resource depreciation. An accounting process that ignores such critical aspects of the economy is a poor tool for the analysis of policy in resource-based economies. This is the most serious disadvantage in NNP because decline in natural resources such as forests which will inevitably lead to decline in potential income and economic opportunities of future generations are not accounted for. The value of an asset is determined by its income earning opportunities. Therefore approaches where we set off depreciation against investment cost are inappropriate for SD. The value of an asset is the present value of its income potential. For natural capital, therefore the true loss is the decline in the future income stream due to improper use of the resource. There is an important asymmetry in the way we measure and consider natural capital and man made capital. The importance of politics in environmental accounting in the Netherlands has been discussed by Huizing and Dekker (1992).

3.1.2 Incorporation of natural capital in GDP. Despite the difficulties, many countries have reported the losses in natural resources computed for various sectors. Chisholm (1992) estimated the losses due to land degradation in Australia to be around $4,800 per farm. For Australia as a whole, the losses due to land degradation are estimated to be around $600m per year (Commonwealth of Australia, 1989). Young (1992) estimated the losses of environmental resources in agriculture, land use and natural habitats. Losses in agriculture amounted to around 5 percent of GDP in 1987/1989. The losses due to salinity, water logging, and habitat and land degradation were between 0.6 and 1.6 percent of GDP in 1980/1989 (Table I). Table I shows estimates of losses made only for certain sectors of the countries and hence not comprehensive yet appear significant.

Bartelmus (1994) presents a strategy for Green accounting in Papua New Guinea. Repetto *et al.* (1992) have provided a comprehensive example for Indonesia. Repetto *et al.* (1992) have computed the gross domestic income (GDI) and net domestic income (NDI) as shown in Table II. Table II shows that for most of the period since 1972, there have been losses in their natural resources. The computed NDI has been falling continuously despite the increasing GDI noted in the trend of GDI. This example shows

Table I. Environmental depreciation allowances of selected countries

Authors	Country	Years	Sector	Environmental depreciation (percent)
Young (1992)	Australia	1980/1989	Salinity, water logging, habitat loss	0.6-1.6
Ahmed and Mallick (1997)	Bangladesh	1993	Energy, soil erosion and deforestation	14 of GDP
Repetto *et al.* (1989)	Costa Rica	1989	Deforestation, soil erosion, overfishing	9.0 of GDP
Repetto *et al.* (1989)	Indonesia	1984	Forest	3.6 of GNP
McGrath and Arens (1989)	Indonesia	1984	Soil erosion	0.4 of GNP
Cruz and Repetto (1992)	Philippines	1970/1987	Forestry, soil erosion, coastal fishing	4.0 of GDP
Ahmed and Mallick (1997)	Pakistan	1993	Energy, soil erosion, deforestation	18.0 of GDP
Peskin (1989)	Tanzania	1980	Deforestation	5.0 of GDP
Adger (1993)	Zimbabwe	1987	Deforestation, soil erosion	9.0 of GDP 30.0 of Ag GDP

Source: Ahmed (2000)

Table II. Comparison of GDI and NDI for Indonesia

Year	GDI billion (constant 1973 Rupiahs)	Resource depletion billion (constant 1973 Rupiahs)	NDI
1971	876	1126	2002
1972	1,139	−100	1,039
1973	1,208	−279	929
1974	1,224	2,605	3,829
1975	1,552	−1,121	431
1976	1,690	−684	1,006
1977	1,785	−1,711	74
1978	1,965	−1,607	358
1979	2,128	−2,219	−91
1980	2,331	−2,663	−332
1981	2,704	−2,215	489
1982	2,783	−1,764	1,019
1983	3,776	−2,870	906
1984	3,551	−2,334	1,217

Source: Repetto *et al.* (1992)

that, if natural resource losses are properly valued and deducted from GDP, a completely different trend in NNP may be observed. Environmental accounting that takes account of such losses could provide signals to policy makers that all is not well with the economy.

De Silva and Kotagama (1996) estimated the total economic value (TEV) of forestry in Sri Lanka and its contribution to GDP. They found that the TEV of forestry resource is Rs13,396 million. It was also revealed that the total depreciation of forest timber

stock in 1995 is Rs416.38 million. The true contribution of the forest resource to national income is 2.24 percent of GDP in 1995 which is higher than 0.2 percent estimated by the Central Bank of Sri Lanka.

3.2 Microeconomic perspectives of environmental accounting

3.2.1 Common reporting procedures. Accounting reports have been the most significant formal means of communication of an entity assisting in informed decision making by external resource providers. The external users will evaluate the use of the scarce resources and internal users can use them for operational planning and monitoring the results of operations. Traditional accounting approaches provide partial information by excluding non-priced transactions and important natural resources which are critically important to the assessment of human welfare. Traditional accounting deals with resources that have clearly defined property rights and market prices. Environmental researchers have argued that a better role of accounting on the environment is long overdue (Jones, 1996). Including environmental effects will provide a more complete reporting system for the management of the firm.

If companies wish to demonstrate their contribution to and participate in environmentally sustainable development, they will have to bridge the world of environmental management with that of finance and economics. Environmental accounting focuses on the monetary implications of the environmental impact and aspects of an organization, including implications for cash outlays and revenue, etc. It translates environmental impact and concern into monetary values. A company wishing to embrace SD needs to devise an equitable means of valuing its uses of the environment irrespective of whether it relates to the degradation or to the depletion of resources and that this valuation be disclosed in the company accounts.

3.2.2 Current status of corporate environmental reporting. The thoroughness and success of environmental accounting will be determined by the vision and philosophy of the company. Companies with a well-defined vision of SD will want to embark on full-cost environmental accounting. This implies that accounting will incorporate both private and societal environmental costs. Those companies without an environmentally sustainable development vision may only prefer to use private environmental accounting, with a misguided view that ignoring environmental concerns may maintain high profits. This may be true in the short-run but not in the long-run.

Many large corporations currently present environmental reports of various kinds but these reporting systems are biased (Niskala and Pretes, 1995; Huizing and Dekker, 1992). Examining financial reporting practices of Australian corporations, Deegan (1998) asserts that if left to market forces, disclosure policies will continue to be deficient. The absence of a unified conceptual framework results in a diversity of reports. Many Japanese companies have embraced the greentech or environmentally friendly technology. These environmental approaches have generated large profits. In 1998, Fujitso, generated $30 profit from ecological investments (*Asia Week*, 2000). Automotive manufacturers now offer more green cars. Such changes in technology may perhaps be slower unless pressure is brought upon the polluters to account for the damages incurred and also to pay for that. Proper green accounting will reveal the problems associated with certain technologies and perforce compel them to adopt environmentally friendly approaches to production.

Some companies may feel that environmental accounting may lower profits due to costs of compliance or penalties due to excessive depletion of natural resources, etc. It is relevant here to refer to an actual example of sustainable development auditing approach undertaken by a greening campus restaurant in Sweden which shows that environmental accounting has enhanced company performance. This is the so-called "Lantis Project" initiated by the student union in Stockholm University. The project shows some credible results in the new approach to green accounting. It developed ways of quantitatively evaluating environmental practices using sustainable development records (SDR). The SDR method can be used by other restaurants in order to describe their performance over time and/or in relation to this restaurant (Nilsson *et al.*, 1998).

In most cases, reporting amounts to nothing more than simply providing statements of good intent with little disclosure of any form of verifiable environmental performance data. Many firms produce stand-alone reports with no auditing. Some of the corporations providing such reports in Australia are BHP Ltd, Rio Tinto Ltd and Pacific Power along with many others (Deegan, 1998). The reports by Earth Sanctuaries, an environmental firm in Australia, contain novel forms of valuing environmental resources (e.g. endangered species). Although these approaches are questionable, it implies that the need for environmental reporting has been accepted as a serious concern. Several other trends have been noted in corporation reporting behaviour.

Many corporations produce environmental reports on a voluntary basis. Also, it is being reported that firms whose environmental impacts are significantly higher than others are the ones showing a propensity for voluntary environmental reporting. Some argue that this is a form of deception to avoid critical scrutiny by governments and environmentally conscious public. Increasingly, self-regulation has been adopted by large companies united by professional bodies or tourism associations (Mason and Mowforth, 1995; UNEP, 1995). The World Travel and Tourism Council (WTTC) has established the World Travel and Tourism Research Council (WTTERC) and the Green Globe Programs as worldwide environmental management and public awareness programs for tourism companies, including advice on integrating agenda 21 into business management.

Objections have been raised against decisions and recommendations of these organizations, however. For example, the Green Globe praised Kandalama Hotel in Sri Lanka as environmentally sound but there is evidence that it has damaged water supplies in the area and has had adverse impacts on the local community. Nearly 50,000 people protested against this hotel in 1992 (Mihikatha Institute and Perera, 1994). Similar recognition of the Phuket Yacht Club of Thailand for their environmental improvements were found to be false because the Yacht Club closed access to public land (Kanjananavit, 1992). A study of 69 tourism companies in Britain found voluntary disclosures to be ineffective (Forsyth, 1997).

Some business entities report measures of economic activity in cash terms but not environmental magnitudes in physical units such as the number of carbon dioxide emitted. This approach still fall far short of properly accounting for the environment to develop a measure that will change the way governments think of economic growth.

4. Major issues in environmental accounting

As the foregoing discussion indicates many difficulties still constrain the footsteps of progress in accounting for environmental resources in economic development in a comprehensive manner. The sections below present an analysis of some of the major difficulties that need to be addressed before any significant reporting procedures are developed.

4.1 Method of regulation of environmental effects

The unrestricted growth in industries such as tourism has created serious environmental damage in many countries. There is a growing demand for the regulation of these adverse impacts without damaging the prospects of the tourism sector (Forsyth, 1997). The debate is about the nature of the regulation, i.e. who should guide the disclosures of the environmental aspects in the accounting process. The controversy is on whether the government (command and control), the market (taxes and other incentives) or self-regulation is the best. Some argue that voluntary forms of regulation are preferred to traditional command and control approaches. Recent studies show that government involvement is an imperative as the regulator. The problem arises as to whether governments can act as credible regulators after disastrous failures as regulators in the privatised industries in many of the developing countries We should search for incentive-based mechanisms which have a greater chance of success, but the debate is far from being resolved (Forsyth, 1997).

4.2 Difficulties in valuing environmental goods

A major problem is that some natural resources do not have observable prices. Assigning monetary values to environmental resources is difficult. One would need to use implicit or shadow prices in some way. Even these prices may not be helpful since they may be affected by market imperfections and taxes. The nature of values of environmental resources can be seen in the classification used by Barzetti (1993) and Pearsall (1984) (Table III). The determination of direct use values is relatively easier. Economic use value is the market price one is willing to pay constrained by the ability to pay and other demands of the budget (Peterson *et al.*, 1990). The non-consumptive use values such as values of wilderness have been assessed using methods such as travel cost (TC) and contingent valuation (CV) and other methods. These methods of assigning monetary values to the environmental resources are not perfect and many problems have been observed (Herath, 1999).

Direct use value	Indirect use value	Uncertain use value	Non-use value
Consumptive	Ecological services	Option value	Intrinsic value
E.g. forest products	Watershed protection	Quasi-option value	Existence value
Non-consumptive	Erosion control		Bequest value
Aesthetic	Water quality maintenance		Vicarious value
Spiritual	Preserving biological diversity		
Tourism and recreation	Ground water recharge		
Education and research			

Sources: Barzetti (1993) and Pearsall (1984)

Table III. Types of values

Many people also show non-use values such as existence and option values. Economic non-use values are independent of any current or expected future contact with an object or with the tangible services that it provides. Incorporating non-use valuation procedures, will more accurately reflect the full worth that society attributes to the environment (Crowards, 1997; Brown, 1984). Thus the case for conservation may be better represented with greater account of environmental concerns. In assessing management for environmental resources, if non-use values are apparent, they need to be considered and measured precisely as possible in order that public decision making be as fully informed as possible. The difficulty is how non-use values are defined, the motives upon which they are based, and whether such values are commensurate with measurement in monetary terms.

Whether non-use values should be included in accounting for the environment has not been properly resolved. Non-use values may be motivated by altruism and in that case it is inconsistent with traditional economic motivations of self-interest. The underlying motivations of non-use values may conflict with economic assessment and monetary valuations. Some argue that the natural environment is irreplaceable and damages done will be irreversible and may thus have relatively large non-use values (Randall, 1991). Vicarious values are contingent upon use of the resource by someone and hence contradict the meaning of non-use value. Bequest value has the same argument against it being included in use value. In this case, the non-use values should be incorporated. The other problem is how to estimate non-use values (Mundas, 1997).

Commonly used valuation techniques such as CV, travel cost method (TCM) and Hedonic Pricing have been criticised although some of these weaknesses have been overcome. The National Oceanographic and Atmospheric Administration (NOAA) has issued guidelines on the design of CV studies in environmental damage suits. Some argue that you can never accurately put a price on nature and that attempts to find some way in which to value nature into the neoclassical economic model will fail. Others are convinced that if you do not attempt to find some way in which to value nature, the process of environmental degradation will continue.

The UN approach suggests measuring it in the form of environmental damage. They suggest that the cost of repairing the damage may be a proxy for some damages. This may be true but most environmental assets cannot be given a cost of repairing the damage because damages are often irreversible, but the valuation problem cannot be avoided here. Another important problem in natural resource valuation is that there is a symmetry in the valuation of environmental losses and gains. This is seen in obtaining values for the same damage using the willingness to pay and the willingness to accept compensation. This is an important concern because often we need to measure damages to the environment than gains (Hanemann, 1984).

4.3 Ethical issues in valuation

Since environmental accounting is designed to provide information to stakeholders and others for decision-making, the values should have a sound ethical basis. There are different theories of value. The deontological approach considers the rights of individuals to be the priority. Rawls (1971) belongs to this school of thought. Teleology is defined as acts relating to design or purpose leading to an end. Those advocating teleological views are called utilitarians. They look for the greatest good for the greatest number. Here, the amount of goodness takes precedence over rightness. Virtue

focuses upon character or quality rather than acts, and assumes that right or good acts will emerge from good character. These theories suggest somewhat different forms of obligation for the future. However, all views agree that our ability to influence the well-being of future generations imposes a responsibility upon present generations to issues of fairness, equity, justice and not just efficiency. Rawls' (1971) theory has been used by many in examining social and environmental issues. Rawls' (1971) approach is to view the status quo and how any deviations from these affect the different stakeholder groups. Decision makers need to think through the consequences of any outcomes and how it affects members of the society. Thus, what moral position should be adopted is controversial. Should rights be recognised first as suggested in the deontological approach, or could ends justify the means as is implied by the teleological tradition? The issues remain unresolved.

4.4 Policy problems

Environmental policies themselves may be at the heart of the accounting problem. The taxation provisions in Australia clearly discriminate against natural resources.

The common values ignored are loss of soil, degradation of land due to salinity, value of forestry, the value of the assimilative capacity of the environment, etc. For example, in the present tax provisions, expenditure on structural improvements to land for the prevention and treatment of land degradation such as filling erosion gullies could not be depreciated without provision S75D. S75D is a provision in the Income Tax Assessment Act 1936, where capital expenditure on measures to prevent or repair land degradation qualified for outright deduction in the year of expenditure under S75D. Likewise, without S75D planting's of trees and shrubs primarily and principally to prevent or control land degradation could not be depreciated (Peterson, 1995). Daniell (1998) states that South Australian land use planning controls and policy documents make reference to SD but fail to ensure that it is given sufficiently high priority in decision making. In a climate of economic rationalism, authorities have scant resources for monitoring and policing environmental standards. The forestry and mining sectors in Australia are being criticised for being biased towards commodity production through subsidies and tax concessions.

4.5 Institutional factors

The development of technology is critical for economic advancement. However, technological improvements exacerbated the depletion of natural resources. The losses of natural resources have been attributed to the extractive industries such as agriculture and mining. Willaims (1989) examined the historic trends in Australian wheat yields and concluded that gains in productivity from plant breeding and improved management practices are barely keeping up with declining soil quality. There is evidence of a yield plateau for the last 20 years despite the adoption of newer, potentially higher yielding varieties and that the problem is due to the soil.

4.6 Absence of a uniform reporting framework

Inclusion of the environment in any credible manner in documents designed for information and planning purposes undoubtedly require acceptable reporting methods, computational techniques and indicators. In Australia, this is usually met by the State of the Environment Reports produced by the Commonwealth Government,

the state governments and some agencies. This is a very important document that contains important planning information. A critical evaluation of the reporting methods in Australia indicates that some major problems have to be overcome before environmental accounting becomes a full fledged and credible input into the planning process. The findings are relevant for environmental accounting both at the macro and micro levels.

4.7 Benefit transfer

Since value assessments have been made only in limited instances, the feasibility of using such values in other contexts is a useful aspect to examine. This is the traditional benefit transfer problem. If benefit transfer is possible, it helps to provide values to other scenarios from available sources thereby minimising the data collection process. However, most available studies of environmental valuation studies using methods of non-market valuation indicate that values differ markedly and the substitution of these values in other contexts may be questionable. Some progress is noted in this regard. The new approaches to valuation such as choice modelling provides some credible values and may facilitate the benefit transfer to be more credible. Choice modelling has gained recognition in recent times for non-market valuation, a discrete choice approach based on random utility theory. This method has been applied by Rolfe and Bennett (1996) and Blamey *et al.* (1998). This method apparently produces values that can be more easily transferred to other settings unlike CV or TCM. This is particularly important in developing countries because empirical valuation studies of the environment are seriously lacking in spite of some of these countries being the worst offenders in damaging environmental resources.

Unlike marketed goods for which price information may be available in secondary sources, environmental values are not available in such a format. These values have to be assessed in each case separately. But such empirical studies of environmental resources are not widespread and it is not practical to assess the values of all the natural resources for accounting purposes due to excessive costs. Benefit transfer is of greatest value in such a context. Development of better valuation methods which facilitate valid benefit transfer is a welcome development in environmental accounting.

5. The challenges ahead

The economics, accounting and other relevant professions accept the urgent need to broaden and extend their theories and philosophies in order that some of the environmental effects and resource depletion are accounted for. The foregoing discussion, although not exhaustive by any means, provides some insight into the challenges in developing a more appropriate system of national accounting systems with due recognition of the importance of the natural resource sectors. In a nutshell the following issues should occupy the energies of economists, accountants, management experts, environmentalists and other professions in developing accounting reports providing financial information to a broad stakeholder group.

(1) The development of environmental accounting is complex and collaboration among several disciplines such as economics, accounting, philosophy, psychology and management is required. Future endeavours in developing environmental accounting should have an interdisciplinary focus.

(2) Current practices evidently are partial and development of a complete system of reporting which includes losses and gains to the environment is needed. This implies the development of a conceptual framework that explicitly includes the environment. Mathews (1999) presents a mega-theory of accounting as a possible future scenario.

(3) Develop credible valuation procedures for the environment. This implies taking account of all values, use and non-use. New techniques of measuring environmental values are being developed and their potential need to be examined (e.g. choice modelling). It is the role of the economist, accountant and other disciplines to further refine the measurement techniques so that credible values are generated.

(4) Voluntary reporting procedures may be systematized so that such reporting become mandatory for all business concerns. However, the disincentives of these approaches need to be carefully examined before reporting systems are made mandatory.

(5) Ethical issues need to be incorporated in accounting procedures. Various stakeholders express different environmental interests ranging from active conservationists to those totally unconcerned of the "deep greens". The incorporation of the beliefs of widely differing groups is difficult but is an important challenge.

It is now well accepted that past developmental patterns have not been sustainable due to the excessive use of natural resources. These resources were assigned a very low profile in the early years despite their unique contribution to development. However, now an important place has been assigned to natural resources with the emergence of the concept of SD. Traditional accounting procedures did not include the depletion of natural resources since they were considered to be available in plentiful supply and hence their values were low.

Although environmental reporting improved both at the macro and micro levels, many problems still constrain progress in environmental accounting, the main problem being the difficulty in measuring the values of natural resources which are often not marketed. The debate about the types of values that should or should not be included is still not resolved. There are ethical issues regarding the way certain objects are measured to be incorporated in environmental accounting. There are other fears that may be entertained by firms specially the impact on profits of environmental accounting procedures specially if they show excessive depletion of resources. There is much headway to be made yet specially in obtaining multi-disciplinary support from related professions such as accounting, economics and management to make environmental accounting a common practice in all business enterprises.

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Liang Qichao, Sun Yat-sen, and the 1905-1907 debate on socialism

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Abstract

Purpose – To review one of the earliest Chinese debates on socialism, highlighting the consequent changes in outlook by Sun Yat-sen and Liang Qichao; and to demonstrate the influence of Western economic writers especially Richard T. Ely, Henry George, and German Bismarckian socialists.

Design/methodology/approach – Textual analysis of original Chinese-language materials with extensive direct quotations (in translation).

Findings – Sun initially gave primary attention to land policy, using a (somewhat inconsistent) combination of George's "single tax" and a very different idea of land nationalization. As a result of the debate, however, Sun gave more attention to economic growth, capital formation, and import restriction. Liang initially favored Bismarckian socialism, but moved during the debate to increasing skepticism about a major economic role for government, recognizing the need for entrepreneurship and capital formation.

Originality/value – Existing literature fails to perceive the radical shifts in viewpoint which developed for both Sun and Liang. This is particularly important for Sun, whose later ideas had a major influence on Chinese economic policy after 1927.

Keywords China, Socialism, Modern history

Paper type Literature review

During the waning years of the monarchy in China, major anti-Manchu factions were led by Sun Yat-sen and by Liang Qichao. In 1905-1907 the two factions engaged in a heated debate in their respective newspapers, focusing on Sun's proposals for socialism in general and for land policy in particular. The debates helped to sharpen the views of both sides and were particularly important in the evolution of Sun's economic ideas which became so influential under the Guomindang regime 1927-1949. The debate intensified Liang's antagonism toward socialism, expressed in terms which were prophetic about China's experience after 1949.

Sun Yat-sen (1866-1925) was born into a low-income family in Southeast China. He studied in Hawaii and Hong Kong, learned Western medicine and the English language, and professed belief in Christianity. In 1894, in an effort to secure employment with the imperial government, he submitted a memorial proposing policies to improve the economy to Chief Minister Li Hongzhang. When no appointment materialized, Sun became a revolutionary conspirator aiming to overthrow the Qing monarchy. He helped organize an uprising in October 1895;

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when it failed, he became a wanted criminal. He left China and traveled extensively, organizing, agitating, and raising funds. After six months in Hawaii (where he had family) he came to the US and then to England, where he was captured by the Chinese government briefly and released. While in England, Sun was strongly influenced by the ideas of the American Henry George, which were popularized by Fabian socialists, particularly George Bernard Shaw.

In July 1897 Sun settled in Japan, where a large number of Chinese students were studying, many of whom shared his antipathy toward the Qing. And many Japanese intellectuals were attracted to socialism.

In contrast to Sun, Liang Qichao (1873-1929) undertook the traditional Chinese scholar's pathway to success. After studying the Chinese classics, he passed the provincial examination (a stepping stone to official appointment) but failed the next highest examination in 1890. Soon afterward he became part of the pioneering efforts to familiarize Chinese with Western intellectual developments. He relied heavily on materials translated from Japanese, since he never learned a Western language. Ironically, Liang was appointed by the Guangxu emperor to head a newly-formed government translation bureau, one of many reform measures undertaken in response to China's humiliating defeat by Japan in 1895. Within a few months, however, the reforms were reversed and Liang and other leaders of the reform movement fled to Japan.

Here Liang published a series of Chinese-language newspapers which circulated extensively on the mainland. According to Nathan (1985, p. 48) "Liang's writings were the window on all that was modern and foreign and might be used to save China". Some of his commentaries dealt with economics, culminating in a lengthy 1902 essay summarizing the history of Western economic thought down to Adam Smith (Trescott and Wang, 1994). As early as 1895-1896, Liang noted that:

> . . . westerners deem the rich as the nation's strength. Why? If a nation has rich people, they will invest their capital in manufacturing in order to make a profit. If the number of factories increases, the poor people can be fed[1].

Liang visited the US in 1903, traveling extensively and meeting President Theodore Roosevelt. He became disillusioned with Western democracy and capitalism and was attracted to the Japanese type of authoritarian regime (Nathan; Bernal, 1976, pp. 159, 188, 191).

After 1904, Liang directed his efforts more toward organizing and agitating for political change in China. He and Sun Yat-sen became Japan-based rivals, competing for the allegiance of the numerous Chinese students in Japan and for financial support from wealthy overseas Chinese. In July 1905, Sun organized the Tungmenghui ("Alliance") as a focus for his anti-Qing campaign. He and a number of associates published their own newspapers. Their political platform included a principle Sun called "minsheng", which he often referred to as "socialism".

Because he was trying to raise money from wealthy Chinese businessmen, Sun kept his expositions vague and ambiguous. But it is very significant that on a visit to Belgium in May 1905 Sun asked to affiliate his Chinese groups with the Bureau of the Socialist International – the "Second International". In a newspaper interview, he expressed a strong if vague endorsement for socialization of the means of production, but put land policy first (Bernal, pp. 65-6).

Sun's emphasis in 1905-1907 was not on government ownership and operation of industry, but rather on land. He had been persuaded by Henry George that, in Western nations, private ownership of land was a major source of poverty and an obstacle to economic growth. Sun and his associates were enthusiastic about the social experiments which had been undertaken under Bismarck in Germany, which included pension programs and public housing as well as government ownership and management of railroads[2].

Economic socialism

Sun had used the term "minsheng" – people's livelihood – in relatively non-ideological contexts since 1894. However, in his introduction to the Alliance's new publication *Minbao* (People's Journal), he modified the expression into "minsheng zhu-i" which he identified with socialism (Bernal, p. 68). A broad opening statement of Sun's conception of "minsheng" was published by his colleague Feng Ziyu in 1905. Feng articulated a number of positions which became staple fare in Sun's subsequent economic writings. One was that class conflict was rising in the West, where polarization was developing between rich and poor. However, economic class divisions were not yet severe in China, and appropriate policies might enable China to by-pass this crisis. Specifically, Feng recommended that the government take over all land rent or acquire it through taxation (George's "single tax")[3]. Sun elaborated these points in a speech in Tokyo in October 1906 (Scalapino and Schiffrin, 1959, p. 334). And he probably drafted a statement by the Alliance, which stated that government should:

> . . . assess the value of all the land in the country. The present value of land will still belong to the owner. But all increases in value resulting from reform and social improvements shall belong to the state. . . (Bernal, p. 69)

The "minsheng" views of Sun and his colleagues soon elicited a strong polemical response from Liang. He had himself expressed some sympathy for socialism as early as 1899 (Scalapino and Schiffrin, 1959, p. 335), and he shared the near-Marxian conviction that the industrialized nations were on a dangerous track regarding worker impoverishment and class conflict. But China was a different matter:

> I think the socio-economic situation in Europe and America is bound to produce revolution, but Chinese society and economy need only some remedial efforts to get them on the right track and develop. The dangerous revolutionary proposals are inappropriate (*Congbao*, 1906a, b).

According to Liang, for China socialism would be "unnecessary", "unsuitable" and "impractical". China should give priority to economic growth and increased production, rather then to problems of inequality. "The only way to save today's China is to adopt nationalism; other proposals such as racism [opposition to the Manchu Qing dynasty] and socialism are all inferior to nationalism". He continued "the primary point for the future of China's economy is to encourage capitalists, and the second endeavor is to protect laborers". These goals should be sought through restricting imports[4]. Liang wished to curb the power of foreign capital in China: "when foreign capital dominates China, . . . all our people will be [reduced to the status of] horses and oxen"[5].

To illustrate why socialism was "unnecessary" for China, Liang contrasted conditions in China with those in Europe, where he felt that "today's ideas of revolution are actually reactions to previous revolutions. China has no previous revolution so no

current revolution is necessary" (86, p. 6). Liang used ten pages to illustrate this point, summarizing much of recent European socio-economic history as background. He drew much of his material from the Japanese translation of *Outlines of Economics* by the prominent American economist Richard T. Ely[6].

Liang contrasted China with Europe on three specific points. First, in China "middle-class families are numerous and extremely wealthy families are few"[7]. China has no hereditary aristocracy and does not practice primogeniture in the bequest of wealth. Liang also felt the tax burden was much lighter in China – a point on which he was not very convincing.

In arguing that socialism was "unsuitable" for China, Liang claimed that "socialism considers equality as the primary goal. In brief, socialism intends to decrease capitalists' outrageous activities and improve the welfare of laborers. This is truly a sacred prescription for Europe and America, but to apply this to China may cause more trouble than advantage... The first thing to do is to encourage capitalists ..." (86, pp. 16-7) Liang's attitude was in sharp contrast to that of Sun who perceived the capitalists as a harmful influence.

Liang noted that they lived in an age of international capital competition; international capital was mobile, able to seek out low wages and rents. Western countries possessed huge amounts of capital and advanced technology.

> If China does not have her own capitalists, than foreign capitalists will invade and occupy the country; those with little or no capital will be controlled and dying under foreigners' feet, with no chance to revive (86, p. 18).

Liang believed that:

> ... if we could unite Chinese capital and Western technology, by using low rent and low wages to pursue profit, our wealth may advance ten years and can be competitive in the world market ... (86, p. 18).

In Liang's view, Sun and his associates were:

> ... advocating revolutionary socialism which is against the benefits of the whole nation; oppressing capitalists is their primary aim. If the people follow their advice and encourage laborers to demand shorter working hours as well as higher wages, and threaten with syndicalist strikes, then [Chinese] capitalists will be weakened internationally, ... and foreign capital will flood in and control the whole Chinese market... People of the whole nation will be under foreign whips to earn their poor living.

In reality, of course, such labor unrest as Liang feared would more likely repel foreign capital. And one may doubt that China's supply of capital was sufficient for the sort of "import-substitution" policy he suggested.

In arguing that it was "impractical" for China to adopt socialism, Liang pointed out that:

> ... socialism is an ideal rather than a fact. Even with the level of development in Europe and America, one doubts that socialism could be feasible in the next 100 years. It is totally out of the question that China is qualified to practice socialism (86, p. 21).

However, Chinese intellectuals were aware of socialist elements in the Russian revolution of 1905. Prior to 1917 there was no living successful example of a genuine socialist program which China could use as a model[8].

Minbao replies

Sun's group responded with an article of 111 pages in *Minbao*(1907) No. 12 (3 March 1907), written jointly by Hu Hanmin and Wang Jingwei using the pen-name Minyi. They directed most of their fire at Liang's reasons for considering socialism "unnecessary", "unsuitable" and "impractical". This was a forceful piece with intellectual depth that Liang seldom encountered – perhaps the best article on economic matters to appear in *Minbao*.

Minyi took up Liang's points in detail. He had argued that Europe was ripe for socialism because of aristocracy, past revolutions, and heavy taxation. Minyi's response was – what about America? For one thing, America appears to have just the sort of conditions Liang is advocating – a protectionist system with favorable conditions for capitalists. And like China, America has no system of aristocracy, property bequests are shared among sons, and the tax burden is light. Yet inequality is severe (12, pp. 53-8). If America appears ripe for socialism, why not China?

Liang had argued that, in Western capitalist countries, individuals could share in profits by purchasing corporate stocks, "a sign that socioeconomic distribution will be improved". Minyi responded by noting that small stockholders would be too insignificant to influence company policies (12, p. 61).

Minyi attacked Liang's antagonism toward foreign capital.

> If foreign capital could be introduced into China, . . . we would certainly welcome it . . . Liang should not regard the international economic situation as warfare. . . Those foreigners who can do profitable business in China are also beneficial to us; they are not the only winners (12, pp. 69-70).

They illustrated the benefits of international cooperation with activities of America's Standard Oil and Japanese coal and oil companies.

Liang's protectionism was the next target. Minyi acknowledged that protectionists and their adversaries "both possess strong doctrines to criticize each other and there is no agreed conclusion on this issue". But they insisted that under protection, businesses will be less strongly motivated to innovate and sharpen their competitive vigor. A free-trade policy would encourage people to "do what is most appropriate in trade"[9].

Minyi accused Liang of inconsistency in favoring *quasi*-socialistic measures to ameliorate income distribution (such as progressive taxation of incomes and inheritance, factory acts, etc.) while opposing socialist organization of production. But this "inconsistency" was common for such authorities as John Stuart Mill and the British Fabian Socialists. When Minyi claimed that Liang "is only concerned with production and disregards personal wealth disparity", they may have felt that only through socialization of production would income distribution be fundamentally improved.

Minyi rather lamely responded to Liang's point that there was no real working model of socialism, conceding that they did not aspire to a "perfect social revolution" (12, p. 90). And they struggled with the semantics of socialism, defining Sun's socialism as "Demosology", a term which Liang appropriately denounced as "monstrous".

Land nationalization

In contrast to the foregoing, relatively unfocused discussions of socialism, the discussions of land nationalization were much better defined. In *Congbao* No. 86 Liang criticized Sun's group for their:

> ... claims that land nationalization is their only goal. They do not understand that land nationalization is only a partial condition of social revolution ... [Sun and associates] claim that Europe and America could not resolve their social problems because they could not resolve their land problems, and that as soon as land problems are resolved, the social problems will be resolved. This view shows that they do not understand what socialism is[10].

In Liang's view, capital rather than land was at the root of the inequality of the West, but in a non-Marxist manner. Land prices and rents are rising, Liang agreed, but as

> ... a result of capital development. Prior to the European industrial revolution ... land utilization was not extensive, the value of land was no different from owning stony land. As capital became developed, land prices also increased. The power of landlords in industry is the result of the power of capital ... Capitalists often purchase undeveloped land at a very low price and improve its quality with capital that may create double profits [in land price and capital investment]. This shows again the dominance of capital over land... Briefly, the primary aim in trying to solve social problems is to solve the capital problem first; ... the land problem is auxiliary to the capital problem (86, p. 22).

Sun and his associates were urging (following Henry George) that increments in land values should be captured by government.

> Suppose someone owns a tract worth $1,000. Its price can be set at $1,000 or even as high as $2,000. If in the future due to transportation or other reasons this land becomes worth $10,000, the owner should receive no more than $2,000, which is already a profitable price. The increase of $8,000 should go to the state... This measure will avoid the problem of land monopoly by rich people (idem).

Sun was confident that: "Land in interior China is still underdeveloped, and prices have remained stable. It should be easy to implement this policy". Sun shared Henry George's conviction that taxing land-value increments would remove an obstacle to economic development and would provide abundant revenue for government:

> After this social revolution, rent revenue will be the sole income of the state; all people will be free from taxation, and this will make China the richest country on earth (86, p. 23).

Viewed a century later, it is easy to see the large element of fantasy in these proposals. Potential revolutionaries like Sun needed this kind of zeal to incite people. Liang's perspective was much more realistic as he reviewed these propositions. He recognized that Sun and colleagues appeared to oscillate between two different policy proposals. One was the literal Henry George single-tax, wherein land remains privately owned but is subject to a capital-gains tax up to 100 percent. The other is that the government would acquire land and rent it out for private use – a position which Henry George had strongly opposed. Liang asked: if the land will be nationalized, why bother to assess the current value? Can lands be freely bought and sold after assessing their value? Will government purchase the land as soon as the valuation is determined? If government purchases the land immediately, there will be no further purchase or sale, so how can there be the supposed $8,000 increment? If government will purchase the land later, why bother to fix the land price now? And can the government afford to purchase a large proportion of the land of the nation? (86, p. 25).

Liang challenged Sun's view that the proposal could easily be implemented in China.

> Land prices in our Guangdong Province are now much higher than twenty years ago. If a standard land price cannot be identified after price increases, how can government find appropriate prices?

If government becomes the landowner, the people will need to rent land for farms or factories. People with more capital or more influence would be able to control more and better land, while ordinary people would be "confined to limited and poor places". How could land nationalization help eliminate the disparity between rich and poor? Only by eliminating windfall wealth from land. Government would need to determine rents for many different qualities and different locations. How would they distribute lands among competing demands? For government to undertake this would entail heavy costs and administrative burdens. If a farmer rents land, would it be transferred automatically to his family on his death, or would it revert to government for reassignment? These issues became very relevant when China's government under Mao Zedong did seize title to all land – a condition which has not been reversed.

Finally, Liang was skeptical that the supposed single tax would be sufficient to meet government fiscal needs, particularly if social welfare expenditures were to increase.

Minbao's reply

Sun and his colleagues fought back in No. 12 of *Minbao* (March 1907). They tried to demonstrate that "in order to resolve social problems, one has to solve the land problem first". They cited the Pacific Railways in the US to illustrate a situation where "capital is dominated by land" – referring to the extensive land grants by which the government subsidized construction. The authors were confident that:

> When land nationalization is implemented, the production of the nation will progress significantly. There will be no more unproductive rentiers [landlords], nor uncultivated or wasted land; all factors will be invested in production (12, p. 86).

How this result follows is not clear; certainly these benefits did not flow easily when land was nationalized in the Soviet Union and China.

Minbao reiterated confidence in fiscal adequacy:

> The land tax on the Chinese people is now about five percent of their rent. Before arriving at the treasury, these funds have been eroded by corrupt administrators, but the central government still receives about 400 million taels in revenue . . . [After land nationalization], as China will progress, in less than ten years the recent revenue of China will double. . . With these 800 million taels of revenue we may do something to develop railroads, mines, post offices, electric power, water supply, etc. without worrying about the capitals involved. . . These benefits result from natural progress, not from encouraging capitalists (12, p. 75-6).

The most striking feature of these passages is not the shaky revenue projections, but the fantasies about all the glorious state-dominated projects to which they might be devoted.

This theme was further extended:

> . . . land nationalization means the state is the only landlord. With rent revenue alone the state will be a big capitalist. This will enable the state to run the business of natural monopolies. Other business will remain in private hands. Socialism is not against people's wealth but against having that wealth privately held in ways that lead to social inequality. Land

> nationalization will improve income equality in several aspects. First, since land cannot be privately owned, there will be no landlord to receive the output of the land without making any contribution or to dominate industries with their wealth. Second, capitalists, therefore, cannot use their two weapons [land and capital] to control laborers... Third, when there is no private land, all capital will be used in production rather than in profit-diluting activities [land speculation]; output of the society will be increased and there will be no problem of shortage (12, p. 101).

Why nationalize land but not capital? "Land can be monopolized, but capital cannot be monopolized" (12, p. 103). Clearly, these rhetorical flourishes did nothing to answer Liang's appropriate questions concerning how the government would manage its land holdings to promote productivity and social justice.

Liang's long refutations

Liang responded to *Minbao* 12 with an even longer article in three successive issues of Congbao (nos., p. 90-92). He focused on three dimensions of land nationalization: financial, economic, and social.

Liang argued it was foolish to put aside other sources of tax revenue. When population increased and national administrative burdens multiplied in the future, if one relied entirely on the single tax, its rate would need to increase. This new tax rate might be higher than the exploitative rent paid to the landlord decades earlier, so the state would become the single exploitive landlord. (It is easy to see this development in present-day China.) And farmers would end up again bearing most of the tax burden. In contrast, with a private-enterprise system and diverse taxes, everyone will strive for growth (out of self-interest), and more tax resources will arise when commerce and industry are developed. Progressive tax rates will help to mitigate income disparities. Reliance on the single tax would work against Liang's proposal to use the import tariff to protect domestic industry. Whatever people may feel about land nationalization, "the government has no magic power of alchemy; we do not know how to pay for the nationalized land" (18, p. 11). Liang went on to argue that:

> China's future policy of managing land should not only be the retention of privately owned land in private hands, but even that land which was originally government-owned should gradually be broken up and returned to private hands (Scalapino and Schiffrin, p. 339).

He argued that "If people's property rights in land are taken away, this would take away their most important property right. Half of the personal motivations toward creativity and industry would be lost" (18, p. 24).

Although Liang had earlier favored government ownership of utilities and other natural monopolies, in 1907 he unleashed a formidable arsenal of arguments against government ownership and management. As Bernal summarized his views, Liang

> ... gave high praise for the entrepreneur, who despite his selfishness helped the country by moving capital to the right place and by taking risks... As officials could not benefit directly from development, they would not take risks and be good pioneers.

Even in England, Liang wrote:

> ... because of the growth of public enterprises, a bureaucratic tyranny is growing... In China ... the official power will be even heavier, and the evil phenomenon of the democratic dictatorship will be inevitable (Bernal, pp. 182-3).

Later developments

At the time, the debates of 1905-1907 appeared inconclusive. Neither side could appreciate the administrative incompetence and corruption, which were characteristic of the Chinese government for much of the twentieth century. Neither Liang nor Sun participated directly in the revolutionary actions, which overthrew the Qing monarchy in 1911-1912, although that event received impetus from their revolutionary agitations. Both Liang and Sun returned to China, and both intermittently held public office. Sun returned in triumph to become Provisional President of the new republic in 1912, but was soon pushed aside by the crafty warlord Yuan Shikai. Sun then served a year as Minister of Railways. Soon after returning to the mainland, Sun helped transform the Tungmenghui into the Guomindang – destined to become the dominant political organization of pre-Communist China.

Sun continued to write prolifically on social, political, and economic topics. In 1920 he published *The International Development of China* It is evident that the 1905-1907 debates helped him to sharpen and extend his ideas on economic policy. Consistent with his position in the 1905-1907 debates, he urged "that the vast resources of China be developed internationally under a socialistic scheme" (p. 6). This would extend to government development of heavy industry, to include iron and steel, coal, cement, and transport equipment. These developments would be financed with the aid of international capital and expertise, anticipating by a generation the kind of programs associated with the World Bank.

Sun wisely backed away from the 1905-1907 fixation on land nationalization, a tribute to the cogency of Liang's attack on that principle. There was one creative exception. Sun's construction proposals involved substantial reclamation of lands initially under water. By selling these, government could obtain some of the funds need for these projects. Further, he urged "excess condemnation" – government should acquire more land than the construction itself would require, selling off the excess at a profit to help finance the development.

Sun stuck by his attachment to Henry George's proposal to tax land-value increments, and developed an ingenious way to develop it. Every landowner should be required to declare a value for his land. To prevent undervaluation, the government would have the right to purchase any tract at the declared value. But such purchase was no longer a big part of the plan.

Instead, Sun shifted his attention to agricultural land, which received very little attention in the 1905-1907 debates. As early as 1899 he had urged that "all who till should receive land". After his return to China, his political speeches often advocated "all land to the tillers". Although the Guomindang government gave lip service to this principle, its application came only in 1950, in the short-lived land reform of the Maoist government – soon to be undone by collectivization.

In 1925, shortly after his death, Sun's *San-min Zhu-I* (Three People's Principles) was published. Here we find evidence that Sun adopted two more of Liang's principles from the 1905-1907 debate. The first was tariff protection for Chinese industry. The second was a general, if vague, plan for "control of capital".

Liang served briefly in the Chinese government as Minister of Justice (1913), a Counselor to the Monetary Bureau (1913) and Minister of Finance (1917), and attended the Paris Peace Conference (1919). He tried without success to implement Western proposals that China replace its silver-based monetary system with a gold standard.

One of Liang's most effective points in the 1905-1907 debates was his challenge to the opponents to explain how government ought to manage the land they proposed to nationalize. This same sort of challenge was even more appropriate against Sun's grandiose socialist fantasies of 1920-1925. Those fantasies were taken up with great fanfare by the Chinese government under Chiang Kai-shek, which elevated Sun to a position of virtual sainthood. Those ideas became the basis for the government's take-over or development of much of China's heavy industry during the war with Japan 1937-1945.

In the 1920s, after the emergence of a genuine revolutionary Communist movement in China, Liang reiterated some of his fears of 1907:

> If we desire to transplant to China the centralized socialism conceived of by Marx and put into practice by Lenin, then it, too . . . because it runs counter to the national character, must fail in the end (Levenson, p. 212).

The socialistic designs of Sun's later writings went far beyond those of the 1905-1907 debates. Those designs provided a rationale for extensive government ownership and management of industrial facilities, largely developed after 1937 during the war with Japan. These experiences and the attendant publicity given to Sun's ideas helped condition Chinese to the kind of economic program developed after 1949 by the Communists. Sun was no Communist, and his writings avoided an appeal to violence and terror. But the debates of 1905-1907 helped to shape his evolving socialist vision, with far-reaching consequences.

Conclusions

The 1905-1907 debates between Sun Yat-sen (and associates) and Liang Qichao focused on two types of issues. The first was the desirability of socialism as a general principle. Both sides were initially favorably disposed toward programs of limited intervention epitomized by Bismarck's Germany. But Liang became increasingly critical of even such programs.

More specific controversy focused on Sun's proposals concerning government land management. Sun and his colleagues muddled together two different proposals. One was to apply Henry George's proposed single tax on increments of land value. The other was for government to acquire (all, most, much, some?) land, which would be rented to farmers and businesses. Liang raised cogent challenges to these proposals, asking for guidelines about how government would manage these huge responsibilities. Sun and his colleagues displayed no awareness of the immense problems of optimization in the use of scarce economic resources.

The debates apparently propelled Sun and Liang in divergent directions regarding economic matters. In the 1920s Sun advanced far-reaching proposals for a socialist economy, proposals which bear considerable resemblance to what developed in China under Mao Zedong. Liang, on the other hand, became increasingly apprehensive about the dangers implicit in vast increase in government powers.

Notes

1. "Modern Interpretation of Biographies of the Money-makers by Ssu-ma Chien", (orig. 1896-1897) *Yinpingshi Hochih Wenchi*, pt. 1, 2; pp. 35-46).
2. Ironically, Henry George had been strongly opposed to socialism, including government ownership and management of land. He favored taxing the increases in land value, which

resulted from economic growth (Lin, 1974; Lindholm and Lin, 1977; Schiffrin, 1957; Trescott, 1994).

3. Feng's ideas are summarized in Scalapino and Schiffrin (1959, pp. 326-9). They are not entirely consistent in describing the land proposals. On page 328, the state is "collecting all rent in the form of taxes", while at page 332 government is "appropriating only that part of rent which increased after the plan would go into effect". In October 1906, Sun himself advocated that government ascertains the value of each tract of land and confiscate or tax the unearned increment (p. 334). This was very close to George's proposal.
4. Sun ultimately became a strong advocate of import restriction also. The "unequal treaties" restricted China to import duties of five percent or less. Every patriotic Chinese opposed this involuntary "free trade".
5. Sun subsequently gave much emphasis on economic growth in his visionary 1922 plan for China's economy. It was a plea for a massive inflow of foreign capital, but through an institutional filter similar to the World Bank.
6. Ely (1893, p. 308) was a devotee of the Christian Social Gospel who had studied in Germany and admired the Bismarckian reforms. His writings were soon translated in China and were extensively used in Chinese universities. He defended state ownership of "natural monopolies" such as railroads, but was very skeptical about comprehensive socialist programs. "Socialism means coercive cooperation . . . [and] contemplates an expansion of the business functions of government until all business is absorbed". "It does not appear clear to the author how socialism could be made to work in actual life. The danger to freedom seems a very real one" (p. 312).
7. Sun's later writings often reiterated this view.
8. In Sun's later writings, he was quick to nominate the Soviet New Economic Policy of 1921 as a possible model.
9. Liang himself had expressed the general principles of comparative advantage very well in earlier writings, though his protectionist impulse was strong even then.
10. 86, p. 21. Sun's group could have responded that Henry George's land proposals were advanced as an alternative to socialism, intended to make the capitalist system work better. But socialists would not be likely to highlight George's very cogent objections to socialism.

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The formation of conventional expectations under strong uncertainty: a comment

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Abstract

Purpose – This paper comments on Theodore Koutsobinas's recent contribution to the debate on the formation of expectations in situations of strong uncertainty.

Design/methodology/approach – The set of comments focuses not on doctrinal-historical issues, but on Koutsobinas's theoretical framework, which is, in turn, a modified version of the analytical scheme of the state of expectations presented in the present author's 1999 article in the *Journal of Post Keynesian Economics*.

Findings – The paper demonstrates that the original framework developed in the 1999 "Expectations and confidence" article is general enough to accommodate Koutsobinas's concern with conventional expectations. It also shows that some ways of using that framework to discuss conventions have already been explored in subsequent work. The interesting points made by Professor Koutsobinas can thus be investigated with the original framework, without the changes he suggests.

Originality/value – The paper clarifies some elements of the theory of expectations and confidence formation and its use to study conventional and unconventional behaviour.

Keywords Behaviour, Expectancy theory

Paper type Conceptual paper

Introduction

In a recent issue of this journal, Koutsobinas (2004) has made a valuable contribution to the debate on the formation of expectations in situations of strong uncertainty. A considerable part of Professor Koutsobinas's article deals with doctrinal-historical issues pertaining to Keynes's work. As with other aspects of Keynes's writings, there has been much controversy about his views on uncertainty, expectations, conventions, and related issues. Keynes's contributions are insightful but permit of different, sometimes conflicting interpretations. Not surprisingly, therefore, in some instances Koutsobinas's reading of Keynes is also controversial. I will not, however, deal with the doctrinal-historical side of Koutsobinas's article. Instead, I shall focus on its final part, which presents a theoretical framework. This framework is aimed at clarifying and developing Keynes's treatment of conventional expectations. It is, in turn, a modified version of the analytical scheme of the state of expectations that I presented in Dequech (1999). According to Koutsobinas (2004, p. 1116), his scheme borrows the basic features from mine, "but introduces a missing element in the analysis, (namely) the role of the conventional formation of expectations". I am delighted that Professor Koutsobinas has found my scheme useful. His article calls our attention to important issues and contains interesting ideas. I am also grateful to him for providing me with an incentive and an opportunity to discuss some of these issues and ideas.

My two main contentions here can be summarized as follows. First, the original framework that I presented in my "Expectations and confidence" article is general

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enough to accommodate Koutsobinas's concern with conventional expectations. Second, some ways of using that framework to discuss conventions have already been explored in my subsequent work. This substantiates my first claim.

My comment is organized in two parts. The first section explains the general character of my 1999 analytical scheme and briefly shows how it can be used to distinguish conventional from unconventional behaviour. The second section discusses the elements that in Koutsobinas's view should be added to my scheme. It argues that these additions are not necessary.

In defense of a general analytical scheme for studying conventional and unconventional behaviour

As mentioned above, Koutsobinas identifies the role of the conventional formation of expectations as a missing element in my 1999 analysis. Admittedly, my 1999 article in the *Journal of Post Keynesian Economics* did not highlight conventional expectations or conventional behaviour. The reason is, however, that it was intended to develop a general analytical scheme to study the determination of the state of expectations. The scheme is general in the sense that it can be used to discuss conventional or unconventional expectations and behaviour.

The motivation for developing that scheme was two-fold. First, I found Keynes's *General Theory* and the Post Keynesian literature quite unclear about the relation between animal spirits, confidence, optimism, and the like. Second, Keynes and many Post Keynesians did not place enough emphasis on creativity and innovativeness, particularly when dealing with conventions and arguing for the rationality of conventional behaviour under uncertainty. My 1999 analytical scheme was an attempt to clarify some aspects that were not clearly distinguished and to introduce or highlight others that were neglected in the literature[1]. Among both groups of aspects are factors that are crucial to determining whether behaviour under uncertainty will be conventional or unconventional, as explained below. A concern with conventions was thus a major reason for developing that framework.

This concern also marks my views on uncertainty. Uncertainty necessarily implies some lack of knowledge. Even in situations of fundamental uncertainty, however, this ignorance is not complete. Some features of social reality have as an epistemic counterpart the possibility of some knowledge, together with the lack of knowledge associated with the possibility of creativity and non-predetermined structural change. Among these features are the existence of institutions, including conventions, and some characteristics of the process of technological change (Dequech, 2000, 2004).

Some knowledge is therefore possible under fundamental or, more generally, strong uncertainty. This knowledge is, however, necessarily limited. It has to be supplemented by something else so that an image of the future can be formed and used to guide action in the present. In my analytical scheme, the two factors that supplement knowledge are the optimistic disposition (animal spirits redefined) and creativity. The optimistic disposition to face uncertainty is not merely "a spontaneous urge to action rather than inaction", as Keynes (1936, p. 161) wrote of animal spirits. It is a disposition that comes in (ordinal) degrees and is combined with optimism or pessimism, leading to inaction or to different kinds of action. Creativity is an ability to see and do things in a novel way. Each person's creativity may be strong, weak, or

even absent. Creativity in expectations is expressed as an innovative imagination, i.e. as the ability to imagine a future that is, at least in some aspects, radically different from the present. If creativity is weak, the imagined future is essentially similar to the present in all aspects, except perhaps those that reflect spontaneous optimism. In product markets, for example, spontaneous optimism affects profit expectations by affecting expectations about the aggregate level of activity. An economy may be expected to be at a different level of activity in the future while its expected structure is the same as in the present. Creativity affects profit expectations in a different way, since it involves some expected structural change, apart from changes in the parameters that reflect optimism about the aggregate level of activity.

The framework developed in 1999 has been applied to a discussion of conventional and unconventional behaviour under uncertainty (Dequech, 2003). The basic idea is that, given people's knowledge, including knowledge of conventions, their behaviour in the pursuit of whatever ends they accept will depend on their optimistic disposition to face uncertainty and on their creativity.

As with any decision to act under uncertainty, to follow a convention often requires a considerably strong optimistic disposition to face uncertainty. If this optimistic disposition is weak, the person violates the convention by doing nothing and postponing an active decision. At the other extreme, there may be a type of behaviour that implies violating the convention in the other direction and requires an optimistic disposition stronger than the one underlying conventional behaviour.

Furthermore, the adoption or not of conventional behaviour depends also on creativity – or the lack thereof. Very often, people behave conventionally because they just cannot conceive of an alternative way of doing things. In contrast, people with a strong creativity tend to be unconventional. Not only can they do something, instead of indefinitely postponing a decision, but also they can do something different from the convention.

My scheme of analysis if also general in the sense that it can be applied to many spheres of economic and non-economic action. On the other hand, it was developed with a special concern with decisions involving liquidity preference. The expectations of profit from holding less liquid assets (e.g. capital goods) depend on knowledge, spontaneous optimism and on creativity. The stronger the animal spirits, the more spontaneously optimistic the agent and the higher the expectation of profit. Creativity may lead an agent such as the potentially innovative entrepreneur to have an extraordinary expectation of profit. Behaviour depends, however, not only on expectations but also on the confidence with which these expectations are held. Confidence in the expectations of profit from holding less liquid assets varies inversely with the perceived degree of uncertainty (basically determined by knowledge) and with the degree of uncertainty aversion (determined by animal spirits). In turn, the liquid premium of liquid assets is inversely related to that confidence (for a formal analysis, see Dequech, 2005).

Suppose that there is a convention in operation in a certain market and that following this convention requires people to depart from liquidity. If animal spirits are not sufficiently strong, a person may violate this convention by preferring more liquidity than those who follow the convention. At the other extreme, flouting the convention in the opposite direction may result from even stronger animal spirits than are needed to comply with it and/or from a strong creativity.

Koutsobinas's additional elements: conventional disposition, inference, and conventional formation of expectations

In order to discuss conventional expectations, Koutsobinas proposes that three elements be added to my analytical scheme (contrast his Figure 1 with the one in Dequech, 1999, p. 418). I shall discuss each of these elements, trying to show that their addition is not necessary and may actually create some redundancy or confusion.

The first element is "the disposition that individuals hold towards conventions" or the "conventional disposition" (p. 1116). The notion of such a disposition may at first be intuitively appealing, but adding it raises at least one problem: how to distinguish it from other elements in my analytical scheme? For example, I have argued that, in order to break with existing conventions by introducing an innovation, one needs a strong creativity and a strong disposition to face uncertainty. I would say that these two factors certainly affect and perhaps determine what Koutsobinas calls a disposition towards conventions. So does people's knowledge. People have knowledge of existing conventions, but whether they will follow or break with these conventions may also depend on whether they have been exposed to alternative, unconventional ways of thinking. Conventions may even not be recognized as such, but deemed as natural or as the way to think about something or to do it.

The second element added by Koutsobinas is "inference". Of the three elements he proposes to add, inference possibly is the easier one for me to identify as already included in my analytical framework. Knowledge, as I conceive of it, includes knowledge obtained by inference. Knowledge is not just the possession of a set of informational pieces but also the result of selecting, organizing and interpreting information. The process of constructing knowledge involves inference.

The third element is the "conventional formation of expectations". While in my framework (as in Keynes's) the state of expectations is immediately determined by expectations proper and by the confidence held in these expectations, Koutsobinas adds another element at the same level, namely the "conventional formation (of expectations, presumably)" (Figure 1, p. 1116). This is a more complicated issue and requires a longer discussion.

It is not completely clear to me why Koutsobinas found it necessary to add this element and, in particular, how it should be distinguished from expectations. By "conventional formation (of expectations)" does Koutsobinas really mean the process that leads to this kind of expectation? If so, why not establish a connection between this process and expectations?[2] Or does he actually mean "conventional expectations", as distinct from the process leading to them? If so, why keep another element called "expectations"? Should this other element be renamed "unconventional expectations"? I also do not know why Koutsobinas eliminated in his Figure 1, the connection that I had established between knowledge and expectations, that is, my inclusion of knowledge among the determinants of expectations, along with spontaneous optimism and creativity. As explained above, in my framework expectations may be conventional or unconventional. In either case, they are influenced by whatever relevant knowledge people may have in situations of uncertainty. Even unconventional expectations may in part result from the use of knowledge, including the knowledge of conventions. People may expect to

obtain some gain by intentionally flouting the conventions that they know other people have been following.

Koutsobinas (2004, p. 1115) argues that people's lack of knowledge and of confidence may lead agents to adopt the conventional view. It may indeed, but this requires some knowledge of the conventional view. In my framework, the knowledge of conventions may lead people to have conventional expectations, especially when such knowledge is combined with the lack of creativity and with a spontaneous optimism that is not too strong.

Koutsobinas also seems to argue that the lack of confidence in their own expectations may lead people to adopt conventional expectations (p. 1116). In my framework, expectations are what can be called the final forecasts that people are able to form, on the basis of their knowledge, including their knowledge of other people' opinion. Before considering other people's opinion, expectations might have been different. In the stock exchange, for example, an individual may at first believe that some price will go up, but revise this opinion after somehow finding out that most agents do not share it.

Moreover, whether expectations will be used in practice to guide behaviour depends also on the confidence held in these expectations. This applies to conventional and to unconventional expectations as well. My framework thus allows for the lack of confidence to prevent unconventional expectations from being used as a guide to practical behaviour. The result may be the adoption of conventional behaviour (as distinct from conventional expectations) or the postponement of an active decision, which takes the form, in many economic contexts, of an extreme preference for liquidity. This latter possibility occurs when following the convention requires departing from liquidity and the lack of confidence is too severe.

In conclusion, I would argue that the interesting points made by Professor Koutsobinas can be investigated with my original framework, without the changes he suggests. In comparison with adding Koutsobinas's three elements to my framework, a better alternative would be to build a different framework from scratch, with the specific purpose of incorporating those elements.

Notes

1. My framework is thus a theoretical one. It is in part inspired by Keynes's work but is not supposed to reproduce or explain the thought of Keynes or any other author.
2. There is no arrow linking these two elements in his Figure 1.

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Call for papers

Emerald

Journal of Economic Studies

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It is unusual for a pressure group, if that is what we have, to focus on the needs of others. The international aspect of the democratic process involved has special features. The links to popular music and to familiar movements on globalisation and capitalism can be explored.

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Note from the publisher

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Banking on the customer: customer relations, employment relations and worker identity in the Australian retail banking industry.

Category: Information science.
Winner: Theresa Anderson, University of Technology, Sydney, Australia.
Understandings of relevance and topic as they evolve in the scholarly research process.

Category: Interdisciplinary accounting research.
Winner: Christian Nielsen, Copenhagen Business School, Denmark.
Essays on business reporting: production and consumption of strategic information in the market for information.

Category: International service management.
Winner: Tracey Dagger, University of Western Australia.
Perceived service quality: proximal antecedents and outcomes in the context of a high involvement, high contact, ongoing service.

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Category: Leadership and organizational development.
Winner: Richard Adams, Cranfield University, UK.
Perceptions of innovations: exploring and developing innovation classification.

Category: Management and governance.
Winner: Anna Dempster, Judge Institute of Management, University of Cambridge, UK.
Strategic use of announcement options.

Category: Operations and supply chain management.
Winner: Bin Jiang, DePaul University, USA.
Empirical evidence of outsourcing effects on firm's performance and value in the short term.

Category: Organizational change and development.
Winner: Sally Riad, Victoria University of Wellington, New Zealand.
Managing merger integration: a social constructionist perspective.

Category: Public sector management.
Winner: John Mullins, National University of Ireland, Cork.
Perceptions of leadership in the public library: a transnational study.

Submissions for the second Annual Emerald/EFMD Outstanding Doctoral Research Awards are now being received and we would encourage you to recommend the awards to doctoral candidates who you believe to have undertaken excellent research. The deadline by which we require all applications is the 1 March 2006. For further details about the subject categories, eligibility and submission requirements, please visit the web site: www.emeraldinsight.com/info/researchers/funding/doctoralawards/2006awards.html.