ESTIMATING EQUITY PREFERENCES: AN ANALYSIS OF COMPETING SOCIAL JUSTICE PRINCIPLES

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ABSTRACT

Environmental policies affect the distribution of resources, both financial and environmental, between groups within society. Yet empirical understanding of the application of social justice principles by the community in determining distributional preferences is limited. This paper presents an analysis of the decision-making strategies adopted by respondents when confronted with potential environmental policy options that include changes in both aggregate levels of welfare and equity in distribution between generations. The analysis is based on the results of a choice experiment designed to estimate intergenerational distribution preferences. The estimation of non-linear welfare functions within a conventional conditional logit framework enables analysis of the heuristics employed by respondents in the stated preference context.

The results provide valuable insights into the application of competing social justice principles by respondents. The application of a classical utilitarian social welfare function to the question of intergenerational equity would suggest that in maximising social welfare, each generation be treated equally and respondents would display an aversion to inequality in distribution between generations. Yet linear estimation of the data suggests positive preferences towards future generations. Given the inherent trade-off between an aversion to inequality and positive preferences towards future generations, this paper explores the heuristics of respondents in determining intergenerational distributional preferences.

The findings are important as the non-linear functional forms provide the opportunity to include an inequality parameter in the estimation of the social welfare function and extend the analysis of social welfare maximisation beyond the classical utilitarian framework. The results increase our understanding of intergenerational distribution preferences. In particular they reinforce the findings of positive preferences by the community toward the utility of future generations, despite the presence of an aversion to inequality.

KEYWORDS: Intergenerational Equity, Distribution, Choice Modelling

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I. Introduction

This paper explores the application of social justice principles by respondents in choosing welfare maximising policy preferences from environmental policy alternatives with changes in the distribution of utility between generations. Environmental policies affect the distribution of resources, both financial and environmental, between generations yet empirical understanding of the application of social justice principles and the trade-offs between competing principles is limited (Kopp and Portney 1999). Social justice principles generally either formulate more specific interpretations of utilitarianism or apply alternative or complementary ethical frameworks such as rewards according to contribution, equality of opportunity or equality of outcome (Banuri *et al.* 1996).

Scarborough and Bennett (2008) report the results of a choice modelling study designed to elicit the intergenerational preferences of the general community. The results of their linear modelling reveal a preference for a form of inequality with respondents placing differential weights on the utility of different age groups. More specifically, the results reveal positive preferences toward younger generations.

Contrary to these findings, the application of a classical utilitarian social welfare function to the question of intergenerational equity would suggest that in maximising social welfare, each generation be treated equally and respondents would display an aversion to inequality in distribution between generations. Given this inherent trade-off between an aversion to inequality and positive preferences towards future generations, this paper explores the heuristics of respondents in determining intergenerational distributional preferences.

The results of Scarborough and Bennett (2008) could be a consequence of the linear welfare functions employed. Hence, in order to explore further the decision-making strategies of respondents in applying social justice principles to distributional change, this paper further develops the analysis of Scarborough and Bennett (2008) by reporting the results of the estimation of non-linear social welfare functions within a conventional conditional logit framework on the basis of the same choice modelling data set. This extension is important as the non-linear functional forms provide the opportunity to include an inequality parameter in the estimation of the social welfare function and extend the analysis of social welfare maximisation beyond the classical utilitarian framework. The results increase our understanding of intergenerational distribution preferences. In particular they reinforce the findings of positive preferences by the community toward the utility of future generations, despite the presence of an aversion to inequality.

The paper is structured as follows. Section two provides background on the application of social justice principles in determining intergenerational distribution preferences. This highlights the welfare economic theoretical underpinnings of the analysis of equity preferences. Section three outlines the choice experiment designed to elicit intergenerational distribution preferences. Section four provides the results of the estimation of non-linear social welfare functions within a conditional logit framework. This analysis provides insight into the social justice principles applied by respondents when confronted with the challenge of expressing social welfare maximising preferences. The paper concludes in section five with a discussion of the implications of the findings.

II. Background

This paper is based on the estimation of Bergson-Samuelson social welfare functions (SWF) (Bergson 1938; Samuelson 1947). Randall (1987) describes a SWF as a mathematical relationship expressing societal preferences as to how economic well-being should be distributed among the individual members of society. The SWF, W, is a function of utility U_i, for individuals, $i=1...n$ in society.

$$W = w(U_1, U_2, ...U_n) \qquad [1]$$

Each SWF represents one person's view of the allocation of utility across individuals in society. Assessment of policy options involves analysis of comparisons of changes in welfare. Myles (1995) asserts that the maximisation of a SWF is invariably adopted as the objective of policy in public economics.

Consequently the shape of the SWF is of relevance. Its estimation involves understanding the utility of each individual in each state and aggregating those utilities to the SWF. The functional form of the SWF involves ethical judgements regarding the aggregation of individual utilities. The most common form of the SWF is the classical utilitarian, where the utilities of individuals, $i...n$, are summed, that is:

$$w(U_1 \ldots U_n) = \sum_{i=1}^{n} U_i \qquad [2]$$

This classical utilitarian or Benthamite welfare function, developed by Bentham (1789) and championed by economists such as Mill (1861), Edgeworth (1881), Marshall (1890) and Pigou (1920) has influenced welfare economics, at least as it is applied in most cost benefit analyses. The classical utilitarian SWF assumes a linear relationship where the utility of each individual or group of individuals is treated equally when aggregating social welfare.

Although the classical utilitarian SWF is the most generally applied SWF, other forms of the SWF have also been adopted in the welfare literature. They are reflected in assumptions regarding the willingness to trade-off the utility or wellbeing of one individual for another and illustrated by the slope of the SWF, that is, the social marginal rate of substitution (SMRS). The slope of the SWF reflects inequality in terms of units of utility. It does not indicate indifference to inequality of income or consumption, because the marginal utility derived from an additional unit of consumption may vary between individuals (Johansson 1987). For example, a convex function assumes that the SMRS is diminishing with movement down the SWF. In some instances the further restriction of *constant elasticity* is imposed (Cowell and Gardiner 1999; Pearce 2006).

In this paper the social justice principles applied by respondents when considering distributional allocations are explored. The evidence of non-linear social welfare preferences, including the constant elasticity assumption, is explored within the context of the specific question of the intergenerational distribution implications of environmental policy alternatives.

(i) Intergenerational distribution

The resources available for future production and consumption are inherently dependent on the capital/consumption balance of the current generation. Hence, the intergenerational social justice preferences of the community are an integral distributional aspect of environmental policy. A *utilitarian* ethic assumes that equity between generations is adequately taken care of by adding one generation's utility level to another's and treating each generation equally. Each generation's utility is assumed to depend only on its own consumption. As a consequence, the utilitarian ethic suggests that any generation should only sacrifice a unit of utility when this leads to an increase of more than one unit of utility for any other generation. In more recent times, intergenerational distributional issues are often raised under the banner of *sustainability* as sustainable development implies some general rule about not impairing the capability of future generations to achieve the same level of well-being as the current generation (Pezzey 1989). The strong link between sustainability and social justice between generations has resulted in policy debates increasingly considering intergenerational distributional issues. Hanley *et al*. (2007, p.14) suggest that "economists would say sustainable development is indeed principally an equity rather than an efficiency issue."

However, while sustainability and intergenerational distribution are interrelated, sustainability on its own does not provide an irrefutable notion of intergenerational justice. As Krysiak and Krysiak (2006, p.257) comment, sustainability is "a minimal requirement for intergenerational justice and not a complete concept of justice in itself". This paper seeks to enhance our understanding of the distributional preferences of the community by reporting the findings of a choice experiment where potential environmental policy options influence distribution between generations.

III. Questionnaire design

In the choice modelling experiment, rather than estimating utility as a function of the attributes of goods consumed as in conventional applications, social welfare is estimated as a function of the utility levels of different generations. It is the respondent's conception of social welfare rather than their individual utility that is being maximised in the choices being made. Scarborough and Bennett (2012) provide a comprehensive discussion of the application of the stated preference method of choice modelling to the estimation of distributional preferences. Choices between the distribution associated with the status quo and changes in policy resulting in distributional changes are presented to respondents. In this example, the levels of the attributes of the policy options that were varied were changes in the utility or well-being of different generations within society.

It must be assumed that there exists interpersonally comparable cardinal utility so that respondents are able to make judgements about the well-being of other groups in society. In this application it is assumed that respondents use their knowledge of the well-being of groups within society under the status quo policy. Arrow *et al.* (1996) argue that, although SWFs have been criticised for assuming interpersonal comparability of utility, there seems to be no way of addressing the ethical issues involved in making decisions affecting different generations without making some interpersonal comparisons either implicitly or explicitly. Therefore, decision-making is seen in a broader context of welfare maximization within a social structure rather than individuals maximising their utilities. Hence, each individual has distributional preferences based on their personal social justice preferences.

Respondents to the choice modelling survey were encouraged to adopt a social welfare perspective by the following introduction to the survey instrument:

> *Many environmental policies result in a transfer of both income and resources between generations. For example, some environmental policies are paid for by current taxpayers with the aim of improving the environment for future generations. We are interested in finding out what you think about the way these policies lead to gains for some generations and costs for other generations.*

Hypothetical policies with generic labels (A, B, and C) were used as the sources of distributional change for the choice sets in an attempt to ensure that values other than distribution preferences were not reflected in the respondent's choices. The attributes in this experiment were described in terms of the impact on the utilities of individuals from different generations resulting from the three hypothetical and generic policy options. Individuals with specific generational characteristics were used as proxies for the group described. Following Mackay (1997), a time span of 25 years was taken as a generation. The attributes and levels are described in Table 1.

[Insert Table 1 about here]

The chosen design limited the choices to generations currently living, acknowledging the trade-offs required when considering the cognitive demands placed on respondents by the choice questions. If the generations were extended to those not living, the timing of the distributional changes would become a complicating consideration. The levels of the attributes were described in dollar terms. The dollar terms reflected the change in utility to the individual with the specific characteristic described by the attribute. Dollars were adopted as a metric with which respondents could associate: dollars are a common and well understood metric to respondents. However, respondents were advised in the following way that the dollar values represented the general utility of the individuals, and should not be interpreted as financial wealth alone:

> *In this survey, dollars have been used to measure the gains and losses to different generations. The dollar amounts represent gains and losses from changes to access to environmental resources such as air, water, forests and beaches as well as monetary wealth.* [1]

The levels of the attributes involve the manipulation of attribute differences, not absolute values of the attributes. The hypothetical dollar values represent a one-off loss or gain to the individual representing the group described by the specific characteristic determining the attribute. In this case, there are five levels for each attribute with each level varying well-being to the value of A$500. The emphasis on utility was conveyed to respondents with the use of "smiley faces" to represent utility changes as indicated in the choice set and reference key presented in Figures 1 and 2.

A fractional factorial design taken from Lazari and Anderson (1994) was used to create 25 choice sets. The 25 sets were blocked into groups of five so that each respondent was presented with five choice sets in a survey.

[Insert Figures 1 and 2 about here]

The survey was conducted across a random sample of households in Warrnambool, a regional city in South West Victoria, Australia. A personal drop off and pick up form of distribution and collection was used. A total of 431 questionnaires were distributed. Of the 337 that were collected or returned by mail, 295 were usable giving a response rate of 68.5 per cent. Each of the 295 usable responses included five completed choice sets giving a total of 1475 completed choice sets. Each respondent also completed socio-demographic questions and two qualitative questions; one regarding specific strategies they had employed in answering the choice set questions and one regarding general comments they wished to make about the

[1] It is recognised that a disadvantage associated with this choice of metric is the difficulty for respondents to think in terms of general well-being or welfare and not just monetary income. The distribution of preferences may be sensitive to the choice of metric and it is possible that if a different metric was applied, the distributional preferences may vary.

survey. Comparison of the survey sample's socio-demographics with the Australian Bureau of Statistics (2001) census data indicates a slightly higher representation of females and younger people completing the survey than in the general population.

IV. Analysis

For simplicity the non-linear models have been estimated with socio-demographic independent variables excluded[2]. Standard choice experiment procedures were applied with the distinction that an indirect welfare function rather than an indirect utility function has been assumed. It is assumed $W_z^j = w_z^j + e_z^j$; where w_z^j is the deterministic component for respondent *j* and choice *z,* and can be decomposed in $w_z^j = [\mathbf{X_z^j}]$ where $\mathbf{X_z^j}$ is a vector of the attributes of alternative *z*. The stochastic component of welfare is e_z^j. Hence, in the case of a linear relationship between attributes and the deterministic components of welfare

$$w_z^j = ASC_z + \sum \beta_z \mathbf{X_z^j} \qquad [3]$$

where ASC_z is an alternative specific constant associated with the zero redistribution options, β_z are the coefficients associated with each attribute. Assuming that the stochastic component of welfare is distributed as IID and with an extreme value (Gumbel) distribution, then the probability of an option being chosen can be expressed as the multinomial logit (MNL) or conditional logit (McFadden 1974).

$$P(W_m^j > W_z^j, \forall z \neq m) = \frac{\exp(\mu w_m^j)}{\sum_z (\exp \mu w_z^j)} \qquad [4]$$

where μ is a scale parameter which is inversely proportional to the standard deviation of the error term and w_m^j and w_z^j are conditional indirect welfare functions for choice options *m* and *z*.

The key outputs of the MNL in this welfare based study are the SMRS. Given that the attributes of the choice models are the changes in utility accruing to particular groups then the

[2] Analysis of the socio-demographic variables included in the linear models is reported in Scarborough and Bennett (2008).

SMRS are estimated by the ratios of the marginal welfare changes (*βs*). Focussing on the ratios of the welfare parameters also overcomes the problem of confounding presented by the scale parameter in the choice models. For example, assuming a specific policy, *m*, the SMRS by respondent *j,* between those aged 50 and those aged 25 is:

$$SMRS^{j}_{m^{Aged50}/_{Aged25}} = \frac{\mu\beta^{j}_{mAged50}}{\mu\beta^{j}_{mAged25}} = \frac{\beta^{j}_{mAged50}}{\beta^{j}_{mAged25}} \quad [5]$$

In effect, the SMRS reflects a willingness to accept distributional change. This reflects the average respondent's notion of social justice.

As indicated, the results of the linear models reported in Scarborough and Bennett (2008) reveal a preference for a form of inequality with positive preferences toward younger generations. From this it could be inferred that respondents would prefer to allocate any given transfer entirely to the most favoured group; that is newborns. However, this result could be a consequence of the linear welfare functions employed. The estimation of non-linear functions allows for the possibility that the SMRS changes as the allocations between age groups vary. If this is the case, then it implies inequality aversion that may, at some point, offset the preferences implied by the unequal weighting of marginal allocations to different groups. The non-linear models have been estimated using Biogeme and following a brief description of each model the results are compared in section 4.4. Note that in all models the data on individual transfers have been rescaled by 1000 (i.e. they are $'000) to aid estimation.

(i) Mean variance model

In order to determine whether respondents displayed an aversion to inequality in the distribution of utility between the three generations a mean variance model has been estimated. This assumes that social welfare, as defined in equation [3], depends on both the aggregate utility to the three generations, and the variation in return between them.

$$W = ASC + \beta_1 U_{aged50} + \beta_2 U_{aged25} + \beta_3 U_{newborn} + \alpha VAR \quad [6]$$

Where

$$VAR = \sum_{i=1}^{3}\left(\beta_i U_i - avU\right)^2; \qquad avU = \frac{1}{3}\sum_{i=1}^{3}\beta_i U_i \quad [7]$$

and β and U are the different weights and transfers and avU is the average of transfers as defined above. Thus, in estimating the variance, the weighted transfers between generations have been used rather than the actual transfers. The inclusion of the generational weights within the definition of the variation term makes the utility function non-linear in parameters. The null hypothesis to be tested is that $\beta_1 = \beta_2 = \beta_3$ and $\alpha = 0$ which would indicate classical utilitarian preferences where the utility of each generation is treated equally in the respondents SWF. The findings, summarised in Table 2, reject this hypothesis. The coefficient on the standard deviation variable (α) is negative and significant suggesting an aversion by the respondent sample to inequality in distribution between the different generations, even when one allows for differential weights across generations.

[Insert Table 2 about here]

(ii) Standard exponential model

It is possible that the aversion to inequality displayed by respondents is sensitive to the direction of the transfers to different generations. Hence, a standard exponential model has also been estimated where the absolute inequality aversion is relevant. In this case, theta (θ) is a measure of the absolute inequality aversion and the social welfare function is expressed as:

$$W = ASC - \delta_1 \exp(-\theta U_{aged50}) - \delta_2 \exp(-\theta U_{aged25}) - \delta_3 \exp(-\theta U_{newborn}) \qquad [8]$$

At the limit, a value of $\theta=0$ implies a linear utility function. Table 3 summarises the results of the exponential model. In this model the measure of inequality aversion (θ) is only marginally significant, at the 6% level, suggesting only weak evidence for inequality aversion in respondents' decision-making.

[Insert Table 3 about here]

(iii) Constant Elasticity Social Welfare Function (CES)

As the results of the mean variance model suggest curvature in the SWF representing intergenerational distribution preferences, a constant elasticity function was estimated to further explore the shape of the SWF. Elaboration of the constant elasticity of substitution function is provided in Burton (2002). The results of the estimation of the welfare function expressed in equation [9] are summarised in Table 4.

$$W = \eta(ASC + \beta_1(U_0 + U_{aged50})^{-\alpha} + \beta_2(U_0 + U_{aged25})^{-\alpha} + (1 - \beta_1 - \beta_2) * (U_0 + U_{newborn})^{-\alpha}\ )^{1/(-\alpha)} \qquad [9]$$

Because the model is not linear in the weight parameters, one cannot normalise. An assumption regarding the base level of utility is required for this model as otherwise infeasible regions in the estimation are entered due to negative transfers. For this reason, a grid search with varying base levels of utility was undertaken. However, whether the base level was five or fifty thousand dollars had little effect on the results so a base level of five has been reported. The critical thing to note is that as the value of the baseline utility is changed, estimates of alpha are altered, but the log likelihoods do not change at all[3]. Essentially there is indeterminacy between the aspects of the model, even though the betas do not change. The variance scale parameter is absorbed into the multiplicative parameter η. As with the mean variance model, alpha is significant thereby indicating a degree of inequality aversion by respondents and curvature in the estimated SWF.

[Insert Table 4 about here]

(iv) Comparison of the models

The above models have been compared in order to understand further the heuristics employed by respondents in this social welfare context. The analysis has identified two competing social justice principles being applied by respondents; a desire to favour positively the younger generations and an aversion to inequality in the distribution between the three generations. Of particular interest is how respondents balanced these competing equity principles when faced with choice sets indicating possible distributional change. “Equity equivalents”, analogous to certainty equivalents, have been calculated to explore the trade-off employed by respondents between social justice principles.

[3] Drawing the implied indifference curves under alternative assumptions about the baseline income confirmed that the economic interpretation of the data is unaffected by the assumption used: they are very close.

Results from all models indicate that, for marginal changes, respondents place a higher weight on the utility of newborns. This suggests that if respondents had utility to the equivalent of one thousand dollars to allocate, they would prefer that it all should be allocated to newborns. However, allocating all transfers to this group would maximise the inequality of the distribution. The "equity equivalent" is the minimum total allocation that will generate the same welfare as an unequal allocation solely to the newborn group. Two forms of this can be considered: allowing only positive (or zero) allocations to groups, or also permitting reallocations of existing utility between groups. The results of these estimations are reported in Table 5.

[Insert Table 5 about here]

The results of the three models are consistent in showing that because of the differential weights placed on the three groups, respondents prefer to take utility away from the older age group and re-allocate utility gains to the newborn and aged 25 groups. In cases where negative transfers are allowed, there are significant reductions in total transfers, largely achieved by reallocating away from the older age group. For example, the "equity equivalent" transfers with the mean variance model suggest that the same level of welfare as that achieved by allocating utility to the value of A$1000 to the newborn group could be achieved by a total allocation of utility to the value of A$850; with a utility loss to the value of A$360 to the aged 50 group, a utility gain to the value of A$500 to the aged 25 group and a utility gain to the value of A$710 to the newborn group.

In a policy sense, it may be more appropriate to only consider the possibility of positive transfers (Table 5b). In this case the CES and standard exponential welfare functions show that relatively little reduction in the total transfer can be achieved by allowing for the social welfare improving reduction in inequality. The effect is greater with the mean variance model but not substantially. This suggests that, although statistically significant, the curvature in the SWF is slight.

V. Discussion and conclusion

Economists have long been aware of the conflicting equity principles influencing social justice preferences. The egalitarian principle of each group or person being treated equally, which is the foundation of the classical utilitarian SWF, is often assumed to be the overarching principle to be applied in the consideration of equity objectives. This research finds that in terms of one area of distribution, the distribution of utility between generations, the classical utilitarian SWF may not accurately reflect the social justice preferences of the community.

Game theory experiments have also been used to explore distributional preferences. [See, for example, Güth and van Damme (1998), Selten and Ockenfels (1998) and Bolton and Ockenfels (2000).] These studies indicate that in a variety of different scenarios, when given choices which result in different payoffs, people are willing to sacrifice little to defend egalitarian distributional preferences where equal payoffs for each participant result. Similarly, Charness and Rabin (2002) use a game theory experiment to show that subjects are more concerned with sacrificing to increase the payoffs of low-payoff recipients, than reducing differences in payoffs. Our research supports these findings if we assume that the community view younger generations as likely to be the least well-off group. The positive preferences toward future generations are also possibly implicit in the application of relatively low social discount rates in some high profile environmental cost benefit studies. [For elaboration, see Scarborough 2011].

Hence further research is needed to investigate whether the positive preferences toward younger generations are context specific. If the context was intergenerational transfers resulting from fiscal policy decisions would the findings be different to the environmental context in which this study was undertaken?

Driving these findings are the positive preferences toward the younger generations evident in the data set. This suggests that the heuristics employed by respondents in the stated preference context, when choosing between distributional changes resulting from potential natural resource policy changes, are more complex than implied by a classical utilitarian SWF. In this case, when confronted with alternate intergenerational distribution outcomes, the social justice principle of positively favouring one group, that is the youngest of the generations, had a stronger influence on social decision-making than the preference for equality of outcome.

There are a number of limitations with this research that require further exploration. For example; the reference points of the status quo utility distributions are unknown, the magnitude of the variance of utility distribution in the experimental design may not have been large enough to pick-up the curvature in the SWF, and the extent to which respondents were able to move to a welfare maximising context is difficult to assess. It may be that the positive preferences toward younger generations also represent utility maximisation and interdependent utility functions. Furthermore, as Bolton and Ockenfels (2006) show, distributional preferences are also likely to be dependent on assessments regarding procedural justice and this has not been addressed.

Nevertheless, the work illustrates the potential of stated choice methods to enhance understanding of distributional preferences and the decision-making strategies employed by respondents in a social welfare context. The challenge of incorporating equity considerations in the development of environmental policy is considerable and can only be achieved by increasing our understanding of the distributional preferences of the community and the social justice principles applied in determining these preferences.

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Table 1: Attributes and levels in intergenerational distribution choice experiment

Attribute	Levels ($A)				
Utility change Person Aged 50	-$1,000	-$500	+$500	+$1,000	+$1,500
Utility change Person Aged 25	-$1,000	-$500	+$500	+$1,000	+$1,500
Utility change Newborn	-$1,000	-$500	+$500	+$1,000	+$1,500

Table 2: Results of Mean Variance Model

Variable	Value	Std Error	t-test	P-value
ASC	0.322	0.104	3.08	0.00
Aged50	0.282	0.0453	6.22	0.00
Aged25	0.408	0.0491	8.31	0.00
Newborn	0.646	0.0646	10.12	0.00
VAR	-0.709	0.201	-3.52	0.00

Table 3: Results of Standard Exponential Model

Variable	Value	Std Error	t-test	P-value
ASC	-3.45	1.93	-1.79	0.07
Aged50	0.806	0.452	1.78	0.07
Aged25	1.26	0.693	1.82	0.07
Newborn	1.79	0.927	1.93	0.05
θ	0.372	0.199	1.87	0.06

Table 4: Results of Constant Elasticity Social Welfare Function

Variable	Value	Std Error	t-test	P-value
ASC	5.28	0.0687	76.95	0.00
Aged50	0.22	0.0269	8.05	0.00
Aged25	0.32	0.0282	11.33	0.00
Newborn	0.46	by construction		
α	2.01	0.8800	2.28	0.02
η	1.34	0.103	12.67	0.00

Table 5: Equivalent transfers for $1000 allocated to newborns only

a): Negative transfers allowed

	Constant elasticity	Standard exponential	Mean variance
Aged50	-350	- 830	-360
Aged25	290	360	500
Newborn	980	1,310	710
Total	930	840	850

b) Only positive transfers allowed

	Constant elasticity	Standard exponential	Mean variance
Aged50	0	0	0
Aged25	160	30	280
Newborn	830	970	610
Total	990	1000	890

Figure 1: Example of an intergenerational utility distribution choice set

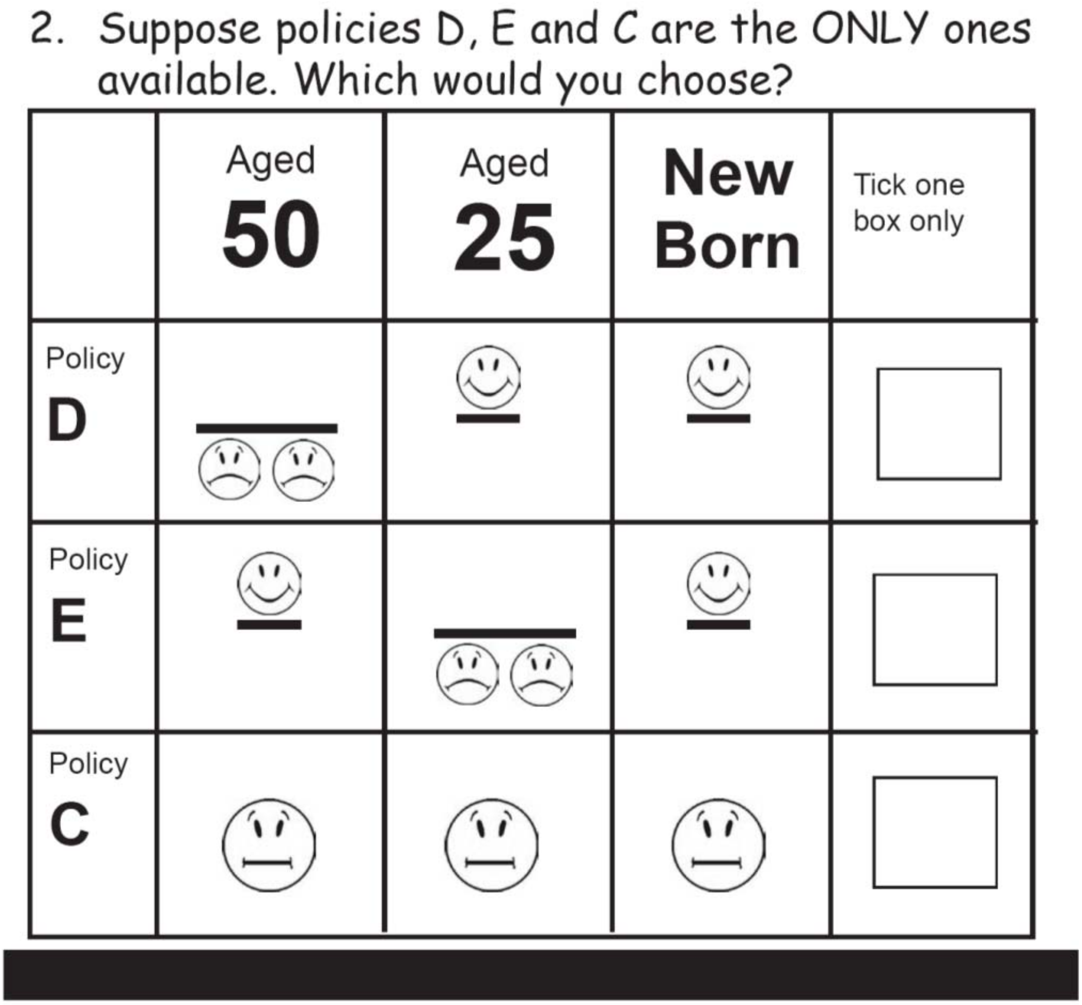

Figure 2: Reference key for choice set in Figure 1