



MEASURING THE ECONOMIC IMPACT OF RELIGIOUS PERSONS ASSOCIATED WITH VOLUNTEERING AND DONATION BEHAVIOUR



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EXECUTIVE SUMMARY

SEIROS, a national organisation comprised of leaders and representatives from different religious traditions, academics and policy makers, has sponsored analysis of the impact of religion on Australian society. SEIROS commissioned Deloitte Access Economics (DAE) in 2017 to study the economic impact of volunteering and donation behaviour by religious persons. This important report opened up a significant new research project on the role of religion in Australian society based on a new, comprehensive survey of Australian religious belief and participation conducted in 2016 known as the Contributing to Australian Society (CAS) survey).

This report takes this significant research project a step further. It extends the DAE analysis to include the economic impact of additional volunteering and donations by traditionally religious persons who were religiously engaged in childhood and maintained this engagement in adult life. The result is a more complete picture of the economic footprint of religious life in Australia.

Additionally, while the DAE analysis focused on attendance at religious services as the main measure of religiosity, this report expands the research beyond measures of religiosity based solely on attendance at religious services. A wider notion of faith is adopted in the analysis, which adds religious beliefs and values (religious, ethical and egoistic as a negative variable) and 'belonging' (identification as spiritual and/or religious) to the measure of religiosity. A greater range of measurement techniques has been considered in order to better examine the relationship between religiosity and altruistic behaviour using data sourced from the CAS survey.

This report deploys econometric analysis using binary logistic regression techniques in a broadly similar manner to the DAE report. There are two components to the AE analysis – the impact of religiosity on volunteering and on donations. Volunteering is measured as being a volunteer to a non-religious cause. Giving is measured as giving to a non-religious cause or to a religious cause, either in terms of financial giving or giving in-kind support of goods. Religiosity is measured both in terms of religious attendance at a regular religious service (at least once a year) or through responses to questions of 'belief' and 'belonging' in the CAS survey.

The analysis conducted by AE shows that religious engagement does lead to a substantial increase in volunteering for non-religious causes. Using religious attendance as the test of religiosity, persons who are traditionally religious are estimated to be 74% more likely to volunteer than persons who have never been religious. Persons who came to religious engagement in adult life without engagement in childhood are estimated to be 122% more likely to volunteer than persons who have never been religious. In more concrete terms, these odds mean that if, among a group of non-religious people, 100 people volunteered, in a similar sized group of religious people, 174 would volunteer. Among late converts to religion, 222 would volunteer.

This equates to 439 million extra hours volunteered each year from religious persons to non-religious causes. This is valued at between \$9-20bn dollars of annual contribution to Australian society excluding volunteering to religious causes.

This analysis also shows that religious persons are much more likely to give than non-religious persons. This is true both of financial and in-kind giving to non-religious causes and of financial and in-kind giving to religious causes. Looking just at financial giving to non-religious causes by religious persons (identified in terms of attendance at a religious service at least once a year), religious commitment leads to an increase in donations of \$1,380m dollars per year, comparing the giving of religious persons with non-religious persons to non-religious causes in a typical year.

The much higher economic gains in the AE report than the DAE report flow from the inclusion in the analysis of the traditionally religious cohort which is roughly 9-10 times larger than the cohort of persons who came to faith in adult life for the first time (the only cohort considered by DAE).

As part of this analysis, SERIOS also considered a range of other statistical techniques to measure the impact of religiosity on volunteering and giving behaviour. Although the stated economic estimates in this report are derived from the binary logistic regression technique, the alternative statistical methods outlined in the report offer scope for further research in this area. Preliminary research in this project indicates that expanding the research project to include alternative methods is likely to support the conclusions presented in this analysis.

Notes on Organisations Associated with this Report

AGAPE ECONOMICS

Agape Economics (AE) is an economic consulting venture founded by Dr Brendan Long, Senior Research Fellow, Charles Sturt University. Working mostly for the not-for-profit sector, Agape Economics specialises in measurement of the economic impacts of social programs. Recent clients include the Australian National University, National Disability Services, Social Impact, The Shop and Distributive Allied Employees Association and SEIROS.

SEIROS

SEIROS, a national organisation comprised of leaders and representatives from different religious traditions, academics and policy makers, has undertaken analysis of the impact of religion on Australian society. 'SEIROS' is short for "The Study of the Economic Impact of Religion on Society". SEIROS' purpose is to make a positive contribution to public debate by engaging in sophisticated, empirically-based research in relation to the contribution that religious activity, as broadly understood, makes to social cohesion in Australia, focusing on benefits achieved by religious organisations by encouraging volunteering and philanthropic donations outside of specifically religious settings, and other economic contributions, for the sake of the whole Australian community and the common good.

INTRODUCTION

All the major religions have sought to provide moral codes and principles for individuals and encouragement for people to strive for the benefit of society. In various ways, and using different terminology, most religions teach that people should be compassionate towards others.

In 2013, Deloitte Access Economics prepared a scoping document in which it noted several areas of life and society in which it was thought that religion might have a beneficial impact on society. The document argued that religions could lead to a reduction of crime, more healthy behaviour, more stable family life, lower rates of tax evasion, higher rates of volunteering and higher rates of donation to charitable causes.¹ SEIROS decided to do some research on the extent to which volunteering and donation to charitable causes might be associated with religion in Australia with the aim of calculating what, if any, the economic benefits for the society might be. A Gallup Poll conducted in 113 countries had found that higher levels of attendance at religious services was associated with greater likelihood of formal volunteering.² Another study across 44 countries using the World Values Study found a relationship between attendance at religious services and involvement in charitable organisations.³ Previous studies in Australia had also found similar results. However, researchers in Australia have argued that the additional volunteering undertaken by people who

¹ Deloitte Access Economics, 'The economic impact of religious activities – scoping study, 2013.

² Bennett, M, 'Religiosity and formal volunteering in global perspective' in *Religion and Volunteering: Complex, Contentested and Ambiguous Relations*, L. Hustinx, J. von Essen, J. Haers & S. Mels, Springer International Publishing, 2015, pp.87-88.

³ Hughes, P. 'The impact of faith on society: some global perspectives' in *Pointers: Bulletin of the Christian Research Association*, 25(2), 2015, pp.6-10.

attended religious organisations was conducted for those religious organisations rather than for the general public good.⁴ Thus SEIROS decided that further research was appropriate to determine whether religious philanthropy (volunteering and donating) in Australia was undertaken for the public good or simply for the benefit of religious group itself. If religious philanthropy in Australia extended beyond the benefit of the religious group itself, SEIROS wanted to measure the economic impact of that volunteering and donating to charitable causes other than religion. Following this research, the first major publicly released work of SEIROS was the report entitled “Economic value of donating and volunteering behaviour associated with religiosity” (SEIROS 2017) launched by Hon. Peter Dutton at Parliament House on 31 May 2018 and reported in mainstream media. This report included econometric research conducted by DAE on the economic benefits of religious engagement in Australia and is outlined in Appendix 1. The report also led to a range of academic publications including peer-reviewed academic publications.⁵

CONTRIBUTING TO AUSTRALIAN SOCIETY SURVEY

In 2016, SEIROS commissioned the Christian Research Association to conduct a broad-based survey of religious commitment to volunteering and giving. The survey, known as the Contributing to Australian Society (CAS) survey, was endorsed by the University of Newcastle, the University of Notre Dame and Charles Sturt University, as well as being reviewed by Deloitte Access Economics. It is the data source for this analysis which undertook the regression based measurement of the impact of religiosity on giving time and money. This survey gathered data from 7,756 self-selecting respondents and used the frequency of survey respondent’s attendance at a religious event as the measure of religiosity. It created a detailed profile of respondent characteristics including 48 questions covering 8 topics across family life, informal contributions to society, unpaid work, giving, influences growing up, employment, education, income, health and personal and household characteristics. The invitation to respond to the survey was contracted to an external agency, which maintains a large panel of more than 900,000 adults who have indicated they are willing to receive surveys. This agency then randomly selected panel respondents within each state and territory of Australia and sent an email invitation with a link to the survey in three separate tranches. While generally matching ABS 2016 census demographics, it is noted that there was a comparatively low representation of people aged 80 and over, full-time workers were a little under-represented and the CAS Survey captured a comparatively low representation of persons whose first language was not English. The sample also did not exactly represent the population in that those people who had signed up naturally had to have access to a computer.

In strict terms, it must be noted that the CAS survey was not a fully randomised sample. It is generally not practicable, outside of health research, to get a full random sample of the adult population due to cost and privacy legislation constraints. In the past this was achievable by access to electoral rolls for social science research but these are no longer available to researchers. The use of large survey panels is common practice in research of this nature in Australia. It provides scope for extrapolation of the survey data to the wider population, although the large sample set does involve the questions about multicollinearity generally found in the measurement of highly personalised social characteristics like religious engagement. However, the CAS survey offers more than a completely non-random panel. While the risk of self-selection bias was not

⁴ Lyons, M. and Nivison-Smith, I, The relationships between religion and volunteering in Australia in *Australian Journal on Volunteering*, 11(2), 2016, pp.25-37.

⁵ Thompson A.K., The economic impact of religious volunteering and donation, *Religious Liberty in Australia: A New Terra Nullius*, Connor Court, Sydney, 2019, pp. 196-13, Long, B., Measuring the economic impact of religiosity in Australia, *Religious Liberty in Australia: A New Terra Nullius*, Connor Court, Sydney, 2019, pp. 214-238, Long B., The ‘Yeast Test’: measuring the economic impact of religiosity in Australia, in *Weaving Theology in Oceania*, B. Green and K. Kanongata’a (eds.), Cambridge Scholars, 2020. pp. 200-218. Hughes, P. Religion and volunteering through groups and organisations, *Journal of Contemporary Ministry*, 4, 2018, pp.121-129. Hughes, P. The Churches’ Role in Volunteering in Urban and Rural Contexts in Australia, in *Rural Theology: International, Ecumenical and Interdisciplinary Perspectives*, (17)1, 2019, pp.18-29. Hughes, P., Do religion and spirituality make a contribution to the public good? The association of religion and spirituality with volunteering in *Journal of the Academic Study of Religion* 34(1), 2021, pp. 96-121.

fully eliminated, random selection from the panel was stratified by States and Territories to ensure that the sample was spread proportionately around these jurisdictions.

THE SCOPE OF THIS RESEARCH PROJECT

SEIROS approached the Commonwealth Government for funding from the Department of Social Services (DSS) to extend the original DAE modelling to include all religious persons. DSS approved funding and this report represents the results of the funding grant (Grant number: CY308I, Organisation ID: 4-CM9M79,1Agreement ID: 4-CXPIJ6U, Schedule ID: 4-CY308IL).

The funded research proposal was to extend the modelling produced by DAE to include the likely impact of all religious persons on volunteering and donation behaviour. Working with the DAE model specification, SEIROS proposed to extend the modelling estimates to calculate the economic impact of the traditionally religious cohort on volunteering and donation behaviour. The proposed research output was a report that calculates the economic impact of both the 'converted' and traditionally religious cohorts with associated economic impacts. SEIROS engaged AE to conduct the research. In this task AE worked with Dr Craig Furneaux of the Queensland University of Technology, who is a leading expert in quantitative research into the Third Sector in Australia.

POTENTIAL RESEARCH METHODS TO EXTEND THE DAE ANALYSIS

As noted in Appendix 1, which summarises the original DAE report to SEIROS, DAE chose a narrow definition of religiosity, specifically, persons who attended a regular religious service at least once a year in adult life but who did not attend religious services in their youth (aged under 12). This is the N-Y cohort in Table 1 below, which outlines the four categories of religious status adopted in the AE and the DAE reports.

The key element of this research project is to extend the economic estimates of the impact of religiosity on volunteering and donation behaviour beyond the N-Y cohort to include the Y-Y cohort – those engaged in religious activity throughout their lives. This follows published analysis of the CAS survey by Thompson and Long⁶ and reflects deficiencies in the DAE approach outlined in Appendix 1. Formation in a community of faith earlier in life is arguably a more important component of the development of religious attitudes than adult conversion. This is evinced in the data from the CAS survey, which show that 34% of respondents indicate continuous religious engagement since childhood.

Retaining a faith commitment throughout life is a significant challenge in the contemporary world. The CAS survey shows that approximately half of those who indicate religious engagement at age 11 have not continued this engagement in adult life (the Y-N cohort). Since half of those who participated in religious engagement during childhood have since lost faith, retaining faith in adult life represents, in itself, a strong treatment effect of religious commitment.

⁶ Thompson A.K., The economic impact of religious volunteering and donation, *Religious Liberty in Australia: A New Terra Nullius*, Connor Court, Sydney, 2019, pp. 196-13, Long, B., Measuring the economic impact of religiosity in Australia, *Religious Liberty in Australia: A New Terra Nullius*, Connor Court, Sydney, 2019, pp. 214-238, Long B., 'The 'Yeast Test': measuring the economic impact of religiosity in Australia, in *Weaving Theology in Oceania*, B. Green and K. Kanongataá (eds.), Cambridge Scholars, 2020. pp. 200-218.

Table 1:
Taxonomy for different categories of religious engagement based on attendance

| | DESCRIPTION | TEST IN THE CAS SURVEY |
|-----|---|--|
| N-N | Persons who do not identify religious engagement in childhood or adult life | Never attended regular religious services at least once a year either as a child or as an adult |
| N-Y | Persons who do not identify religious engagement in childhood but do engage in adult life | Did not attend regular religious services at least once a year in childhood but do attend at least once a year in adult life |
| Y-N | Persons who do identify religious engagement in childhood but not in adult life | Attended regular religious services at least once a year as a child but do not attend as an adult |
| Y-Y | Persons who identify religious engagement in childhood and in adult life | Attended regular religious services at least once a year in childhood and retained this attendance as an adult |

AE has researched a range of statistical techniques to extend the DAE analysis to include the traditionally religious Y-Y cohort.⁷ Recognising that every modelling approach has strengths and weaknesses, multiple methods of statistical analysis were scoped to maximise the opportunity for robust results. These included:

- 1) Binary logistic regression, the method followed by DAE. However, a more comprehensive analysis of the entire religious cohort was used, including the Y-Y cohort.
- 2) Simple linear regression. This is a logical extension of the DAE research, in which giving behaviour, of time or money, is examined in terms of how much individuals give.
- 3) Multivariate Analysis of Co-Variance (MANCOVA) – a standard multivariate regression model with volunteering, financial giving and non-financial giving as variables determined by three wider measures of religiosity captured within the CAS survey. Questions posed in the CAS survey (which reflect current research into understanding religious behaviour) allow for modelling of a richer notion of religiosity. These questions focus on responses to CAS survey questions that broadly capture belief, belonging and behaviour of religious persons.
- 4) Partial Least Squares-Structured Equation Model (PLS-SEM) – a more recently developed and increasingly popular form of statistical analysis that seeks to track causal pathways between a range of measured ‘indicators’ of religiosity and intermediate statistical ‘constructs’ that inform the measurement of the final variable under investigation. PLS-SEM seeks to isolate and measure the different influences on a complex variable like religiosity. The ‘indicators’ are the questions in the CAS survey, building a path to the constructs of 3 measures of religiosity yielding a causal pathway of how these variables determine the final measures of religiously motivated volunteering and giving.

These 4 research methods are summarised in Table 2 below. Appendix 2 outlines these methods in further detail.

⁷ The focus relates to the key section of DSS funding agreement which states: Working with the DAE model specification, SEIROS proposes to extend the modelling estimates to calculate the economic impact of the traditionally religious cohort on volunteering and donation behaviour, following the methodology of the published analysis.

Table 2:
Alternative statistical methods to extend the DAE analysis

| METHOD | SUMMARY | ADVANTAGES | DISADVANTAGES |
|---|---|---|---|
| Binary logistic regression | A logistic regression examines the causes (such as being religious or not) of a specific outcome (e.g. giving or volunteering) while controlling for other independent variables. | This is a discrete and easily understood regression. The likelihood, or probability, can be calculated easily (e.g. the likelihood of someone who is religious giving to a charity compared to someone who was not religious). | As the outcome variable is binary, this counts someone who gives a dollar once, exactly the same as someone who gives a million dollars or a million times. So, while it captures if someone gives, it misses the nuance of how much people give. |
| Linear regression | A linear regression examines how a set of predictor variables (e.g. religion) causes an outcome (e.g. giving time or money). The Generalised Linear Model (GLM) is the best choice of available linear regression methods. | This is a well-known technique which can include categorical variables (such as gender) and scale variables which change in degree (such as age or income). | A linear regression performs well when the data is 'normal', or fits within a bell curve. If the data is heavily skewed then it does not perform well, and the data needs to be manipulated to make it 'fit' the assumptions. It tends to over-simplify complexity. |
| ANCOVA (Multivariate Analysis of Covariance) | A MANCOVA is a statistical technique which examines the effect of categorical variables (such as being an atheist or believer) on an outcome (such as how much a person gives) while controlling for other variables (such as how often one attends a religious service). | A robust technique which tests for moderation effects, i.e., how often one attends religious events may not be a direct determinant of how much one gives, but it might make it increase. | MANCOVAs are more complex to run and some academics would suggest there are more robust analysis methods. It can manage complexity relatively well. |
| PLS-SEM (Partial Least Squares-Structured Equation Model) | PLS-SEM has been developed to enable analysis of complex data sets and for the testing of theoretical frameworks (e.g. do religious people give more than non-religious people when religiosity is measured using multiple variables). | This method enables analysis of complex data and can examine not just how various factors affect an outcome variable (such as religion and giving) but also how various measures might interact when causing such an effect (such as attendance at religious services, beliefs and membership of different types of religious organisations). It can also handle difficult data – that which does not conform to assumptions of 'normality' - or highly skewed data directly. | While this technique has its critics (as with all techniques) it is considered very robust and highly regarded over most other forms of analysis for humanities and business research. |

LOGISTIC REGRESSION CHOSEN AS THE PREFERRED REGRESSION METHOD

AE has selected logistic regression as the preferred method to extend the DAE modelling. Binomial logistic regression is the approach that DAE used to measure the economic impact of religiosity. A binomial logistic regression predicts the probability that an observation falls into one of two categories of a dichotomous dependent variable based on one or more independent variables. In this case the dependent variable is “a person being a volunteer, or not being a volunteer” or “being a donor, or not being a donor”. The key independent variables measure religiosity with a range of other predictor variables like age, gender, education, income etc. included as controls. The ‘odds ratio’ that falls out of the logistic model is the chance that any person who is a volunteer is also religious rather than not religious. The same method is also applied to the probability of persons who are donors being religious rather than not.

Logistic regression analysis requires a reference cohort from which religiosity is measured. This reference cohort is the N-N cohort – those never religious. Logistic regression has been chosen as it offers a comparison of the additional impact on volunteering and giving by the N-Y, Y-Y, or Y-N cohorts relative to the non-religious N-N cohort. The resulting odds ratios allow for a measurement of the extra hours of volunteering or moneys or goods given in these three cohorts relative to the N-N cohort, and therefore allow for measurement of the economic benefits of religiosity in the case of the N-Y and Y-Y cohorts. The Y-N cohort was measured as being statistically insignificant in most of the logistic regression simulations developed in this analysis.

Research into linear regression using the GLM model and MANCOVA indicated statistically significant correlations between religiosity and volunteering and giving behaviour (see Appendix 2). The GLM model was not adopted because, although the final results show statistically significant relationships between religiosity and giving, such correlations were not able to be deployed to produce economic estimates as readily as logistic regression techniques. GLM does not produce an odds ratio. The odds ratio allows a direct calculation of the extra element to volunteering or giving that flows from being religious. MANCOVA was also rejected as the preferred research method for the same reason as linear regression, although the MANCOVA does provide valuable research into how alternative measures of religiosity have less or more impact on giving time and money. While the MANCOVA gives greater granularity on how alternative measures of religiosity in terms of ‘belonging’, ‘belief’ and ‘behaviour’ affect volunteering and giving, the results also provide a less direct measure of the extra element of giving time and money that flows from a religious commitment.

The PLS-SEM analysis, which is outlined as an analytical pathway model in Appendix 2, was not chosen due to the complexity of this analytical process. PLS-SEM was scoped as a research method to deploy if logistic regression were not successful. As the application of logistic regression analysis has been successful, the PLS-SEM approach was not pursued for calculating economic benefits of religiosity for the purposes of this report. It is noted that, like MANCOVA, it offers scope to deal with more complex approaches to measuring religiosity. Like MANCOVA, it is a method that SEIROS could consider developing in subsequent research.

THE LOGISTIC REGRESSION MODEL ADOPTED BY AE

As noted above, a binomial logistic regression predicts the probability that an observation falls into one of two categories of a dichotomous dependent variable based on one or more independent variables. The dependent variable is the outcome that is being measured. In this case the dependent variable is “a person being a volunteer, or not being a volunteer” or “being a donor, or not being a donor”. The independent variables relate to factors that influence the dependent variable. In essence, logistic regression measures the dependent variable as a yes or no response, while measuring the impact of other independent variables on the dependent variable. These independent variables can be either binary variables like gender as male or female, categorical variables, which produce a range of discrete responses like what is your employment situation, or scalar variables, which measure a variable in a numerically ascending range like how busy you are coded in a range of 1-10 (i.e., ‘not busy at all’ to ‘too busy to cope’).

Logistic regression measures the impact of the independent variables on the dependent variable and tests the statistical significance of these independent variables to see which are reliable indicators of changes in the dependent variable. A logistic regression produces an ‘odds ratio’, which is the probability that a person who is in the group displaying the statistically significant independent variable is in the group displaying a yes response to the test of the dependent variable. The ‘odds ratio’ is always made in relation to a reference group – the control group. This control group or reference category is specific to each independent variable.

In the case of both the AE and DAE studies the dependent variable is whether a person is a volunteer or is a donor. It is a binary model – yes or no to giving time as a volunteer and money/goods as a donor. The level of time or money/goods given is not being measured - just whether persons are in the giving groups. While DAE only looked at giving of time or money to non-religious groups, the AE analysis considers the giving of time and money to either religious or non-religious groups, and also considers giving in-kind and giving of money.

Formally, the statistical test is to disprove the null hypotheses involved in the following propositions:

- Null hypotheses (volunteering): There is no statistically significant difference between religious and non-religious people in respect of the likelihood of their volunteering
 - for non-religious causes, all other things being equal (hypothesis 1);
 - for religious causes, all other things being equal (hypothesis 2);
- Null hypotheses (giving) All other things being equal, there is no statistically significant difference between religious and non-religious people in respect of the likelihood of:
 - making monetary donations to non-religious causes (hypothesis 3);
 - making monetary donations to religious causes (hypothesis 4);
 - making non-monetary/in-kind donations to non-religious causes (hypothesis 5);
 - making non-monetary/in-kind donations to religious causes (hypothesis 6).

If either hypothesis 1 or hypothesis 2 is rejected in favour of the alternative hypothesis that religious people are more likely to volunteer, then we can conclude that religious people contribute more than non-religious people to either religious or non-religious causes. Similarly, if any of hypotheses 3-6 are rejected in favour of the alternative hypotheses that religious people are more likely to donate money or in-kind goods, then we can conclude that religious people contribute more than non-religious people to religious or non-religious causes. Hypotheses 2, 4, and 6 are expected to be rejected as religious people seem more likely to give to religious causes than non-religious people. The more critical tests are whether hypotheses 1, 3 and 5 are rejected.

Mathematically, the model calculates the natural logarithm of the odds of volunteering/giving as a linear combination of other factors, including age, gender and religiosity and other independent variables, relative to the baseline reference group measure which is different for each independent variable. The probability of volunteering and giving is modelled separately according to the mathematical formulae:

$$\ln\left(\frac{P_i^{\text{Volunteering}}}{1 - P_i^{\text{Volunteering}}}\right) = \beta_0 + \beta_1 x_{1,i} + \dots + \beta_m x_{m,i} + \epsilon_i$$

$$\ln\left(\frac{P_i^{\text{Giving}}}{1 - P_i^{\text{Giving}}}\right) = \gamma_0 + \gamma_1 z_{1,i} + \dots + \gamma_m y_{m,i} + \eta_i$$

where P_i is the probability of volunteering/giving (money or in-kind); $x_{i \sim m}$ and $z_{i \sim m}$ are the independent variables or factors that are expected potentially to have a statistically significant impact on a person's probability of volunteering/giving.

HOW VOLUNTEERING AND GIVING ARE MEASURED IN THE LOGISTIC REGRESSION MODEL

The dependent variables in the logistic regression are the probability of a person being a volunteer or a donor of money or goods in-kind. Turning first to volunteering, the relevant data in the CAS survey are responses to Question 16. This question asks what area of volunteering a person was engaged in. The list of possible answers and the responses are shown in Table 3. Two tests are required for a person to be deemed a volunteer in the logistic regression: a person is deemed a volunteer if an area of engagement as a volunteer (whether in childhood or adult life) is indicated in answer to Question 16 and time volunteered is indicated as at least one hour in answer to Question 17.

Table 3:
Responses to CAS survey question 16

| | |
|--------------------------|--|
| 16. | Here are examples of the types of organisations or groups for which people may do voluntary work. In the past 12 months, did you do unpaid voluntary work for any of these types of organisations? (Click all that apply or leave blank if none apply.) |
| <input type="checkbox"/> | Arts, music or drama (other than as a performer) |
| <input type="checkbox"/> | Parenting, children or youth |
| <input type="checkbox"/> | Welfare or community services |
| <input type="checkbox"/> | Ethnic or cultural organisations |
| <input type="checkbox"/> | Business, professional or union organisations |
| <input type="checkbox"/> | Education and training (such as schools, U3A) |
| <input type="checkbox"/> | Emergency services |
| <input type="checkbox"/> | Environmental or animal welfare (including landcare) |
| <input type="checkbox"/> | Exercise or health (including gyms, hospitals, infant welfare) |
| <input type="checkbox"/> | International aid and development |
| <input type="checkbox"/> | Political, law or justice organisations |
| <input type="checkbox"/> | Religious organisations (including churches) |
| <input type="checkbox"/> | Sport and physical recreation |
| <input type="checkbox"/> | Other recreational or personal interest groups |
| <input type="checkbox"/> | Other (please describe) |

A person is considered a donor if a gift of any money or goods in-kind is indicated in answer to Question 46 in the survey. In the case of volunteering or giving, the regression simply takes a yes or no response. The quanta of hours volunteered or amounts given are not modelled in this analysis since such measures were shown to produce statistically insignificant results in the DAE analysis as outlined in Appendix 2.

HOW RELIGIOSITY IS MEASURED IN THE AE LOGISTIC REGRESSION

Religiosity measured as behaviour: at least annual attendance at religious services

Religiosity can be viewed via *behaviour*. For example, time spent in prayer, giving and volunteering to religious groups, as well as attending church have all been used to measure religiosity. However, people may attend a church for a variety of reasons (e.g. a social network, business contacts) not necessarily for religious purposes. Hence attendance or non-attendance at church is an important but at best partial measure of religiosity.

Galen (2012) offers a framework⁸ for measuring religiosity through capturing different forms of religious behaviour. This can include prayer, giving, volunteering and attending religious services. However, prayer was not included in the CAS survey as a measure of religiosity. In addition, giving and volunteering are the dependent variables (what we are actually measuring) in the study. Attendance at a regularly held religious service is a reliable measure of religious behaviour. It is by no means a complete measure of religious commitment and excludes some religious people who don't like to participate in structured religious services. Still, for statistical purposes, it offers the measure of religiosity that produces the most robust results from logistic regression analysis.

In addition, as outlined above, this method of measuring religiosity is more amenable to subsequent economic analysis of the benefits of volunteering and donation behaviour than alternatives. Consequently, within the scope of the CAS survey, attendance at religious services is the primary metric for religious behaviour, and the regressions based on religious behaviour measured in terms of attendance are the key statistical measures relied upon to produce economic estimates of the impact of volunteering and donation behaviour.

An immediate methodological choice surfaces at this point. Do we need to focus on the change in religious attendance since childhood or focus solely on attendance now? While the change in religious attendance over a lifespan is important for the sociologist of religion, it is of little relevance for a current economic estimate of religiosity in terms of giving time and money. So, the 'behaviour measure' of religiosity was focused only on religious attendance in adult life as identified in the CAS survey. This represents a departure from the DAE approach.

The raw responses to the CAS survey (Question 26) on the frequency of religious attendance are shown in Table 4. These data give a set of 5 categories for measuring religious behaviour in terms of frequency of attendance.

Table 4:
Frequency of religious attendance

| | RELIGIOUS ATTENDANCE NOW |
|-----------------------|--------------------------|
| Never | 59.0% |
| Once or twice a year | 14.1% |
| Once a quarter | 6.0% |
| Twice a quarter | 4.4% |
| Once or twice a month | 4.3% |
| Once a week or more | 12.3% |

⁸ Galen, L. W. (2012). Does religious belief promote prosociality? A critical examination. *Psychological bulletin*, 138(5), 876 – 906.

AE has adopted the test of religious attendance at a religious event once or more a year as the test of religiosity for the N-Y cohort.⁹ Ideally, a measure of religiosity would consider frequency of attendance as a test of religiosity. However, here a methodological problem emerged. On what objective basis should religiosity be assessed? What is the threshold level of frequency of attendance for religiosity? The choice of what frequency of attendance to choose is an arbitrary one. The level chosen here (attendance once a year or more at a service) is the minimum measure of religious attendance captured by the CAS survey.

In both the DAE and AE models, religiosity as attendance is specified as a set of independent variables. In both analyses there are basically 4 independent religiosity categories presented in Table 1. These are again:

- N->N: No religious attendance when growing up, no religious attendance now;
- Y->N: Had religious attendance when growing up, no religious attendance now;
- N->Y: No religious attendance when growing up, has religious attendance now;
- Y->Y: Had religious attendance when growing up, has religious attendance now;

Logistic regression requires a reference category against which other categories are compared. In terms of religiosity the reference variable is N-N variable – no faith – in both the DAE and AE regressions. While DAE only models the N-Y category, AE includes both the N-Y and the Y-Y category in satisfying the test of religiosity in the logistic regressions.

The AE stratification of the religious sample population into the 4 religious cohorts based on attendance is presented in Table 5 below.

Table 5:
Religious cohorts on the based on attendance

| RELIGIOSITY STATUS FROM CAS SURVEY | FREQUENCY IN CAS SURVEY | PROPORTION |
|---|-------------------------|------------|
| Y - Y - always attended | 1882 | 34.48% |
| Y - N - stopped attending in adult life | 1821 | 33.36% |
| N - Y - started attending in adult life | 276 | 5.06% |
| N - N - never attended | 1480 | 27.11% |

In terms of the regression, the 3 independent variables for religiosity in terms of behaviour are:

- Y-Y
- Y-N
- N-Y

with the N-N cohort as the reference category and included under the variable name 'Attendance'.

Religiosity measured as 'belonging' (identity)

The Australian Bureau of Statistics in each census asks people which denomination, if any, they identify with. However, this is simply a measure of *identity*, or *belonging*. It is an important, but insufficient measure of religiosity and it is best seen as identification of an individual with a specific religious group. This might be identification with a specific religious organisation (e.g. Holland Park Mosque), a denomination (e.g. Catholic) or a broader religious movement (e.g. Charismatic) or a broader conceptualisation of religiosity in general (e.g. agnostic). Moreover, while identification with a specific religion may be on the decline, there

⁹ Based on CAS survey questions this excludes baptism, wedding and funerals.

has been an increase in the number of people who see themselves as spiritual if not committed to a religious institution.

There is a conceptual difference between being sure there is no God (the atheist) and simply being unsure (the agnostic) or being spiritual without a religious affiliation. Even with atheism, some authors seek to distinguish different approaches to atheism; for example, De Botton (2012) refers to ‘reformed or evangelical’ atheism. Other authors argue for differing measures of both religion and spirituality (Glendinning & Bruce 2006), as well as atheism and uncertainty. Religion as ‘belonging’ is more complex than religious affiliation.

The CAS survey asks in Question 29, “Which of the following *best* describes you?” The possible responses are:

- I follow a religion or a faith and consider myself to be a spiritual person
- I follow a religion or a faith, but do not consider myself a spiritual person
- I don’t follow a religion or a faith, but consider myself a spiritual person
- I don’t follow a religion or a faith and don’t consider myself a spiritual person
- I don’t know what to think about religion and spirituality
- Can’t choose or other (please describe)

Here are the raw results presented in Table 6.

Table 6:
Frequency of answers on religious and spiritual identity

| | FREQUENCY | PERCENT |
|-------------------------------------|-----------|---------|
| Follow a religion and spiritual | 1513 | 22.2 |
| Follow a religion not spiritual | 994 | 14.6 |
| Not follow a religion but spiritual | 1704 | 25.0 |
| Neither religious nor spiritual | 1675 | 24.6 |
| Don’t know what to think | 933 | 13.7 |
| Total | 6819 | 100.0 |

This produces a categorical variable, a variable which aligns a respondent’s self-concept of religiosity according to an identified label or ‘category’. In the regression analysis, measures of religious belonging are included in a variable entitled, RELSPIRIT. The reference category is “neither religious nor spiritual”.

Religiosity measured as ‘belief’

Finally, religiosity can be seen as a form of *belief*. Question 30 in the CAS survey contains a number of items relating to the belief systems of respondents. Respondents were asked questions they could answer on a scale. Initially these were coded with 1 definitely true and 5 definitely not true. These have now been inverse coded (a technique that adds 1 to the each score so now 2-6) giving the following statistics.

Table 7:
Descriptive statistics from the CAS survey

| | MEAN | STD. DEVIATION | NUMBER OF RESPONDENTS | MISSING ANSWERS |
|---|------|----------------|-----------------------|-----------------|
| I try to be as honest as I can | 5.45 | .769 | 6607 | 257 |
| I pay as little tax as I legally can | 4.15 | 1.351 | 6073 | 791 |
| Acting on individual rights is more important than needs of others | 3.77 | 1.055 | 6536 | 327 |
| Religious faith helps shape how I live my life | 3.57 | 1.469 | 6490 | 374 |
| Enjoy life and make the most of it | 5.02 | .905 | 6719 | 145 |
| I have strong principles which guide how I live | 4.99 | .916 | 6657 | 206 |
| I believe there is a God who is concerned with human beings | 3.99 | 1.535 | 6122 | 741 |
| The best way to develop spirituality is to take on board whatever is helpful from different spiritualities or religions | 3.81 | 1.276 | 5875 | 989 |
| Being in tune with nature is important | 4.41 | 1.124 | 6554 | 310 |

We have used statistical testing (specifically factor analysis) to group the ‘belief’ variables into three basic sets – called components. The analysis identified 3 component groups in the CAS survey responses.¹⁰

Group 1 – ‘Religious component’

Religious faith helps shape how I live my life

I believe there is a God who is concerned with human beings

Group 2- ‘Ethical component’

I try to be as honest as I can

I have strong principles which guide how I live

Enjoy life and make the most of it

Group 3- ‘Egoist component’

Acting on individual rights is more important than needs of others

I pay as little tax as I legally can

This variable is expected to be negatively correlated with the measure of religious belief.

Groups 1-3 present categories for regression analysis.

¹⁰ This is outlined in more detail in section of ‘Preparing the data for economic analysis’ below.

THE CONTROL VARIABLES IN AE REGRESSION MODELLING

In addition to the independent variables we are seeking to measure as tests of religiosity, the model contains a number of independent variables as control variables. The logistic regression calculates the impact of all independent variables separately (as distinct from more complex analysis in MANCOVA or PLS-SEM techniques). Interaction effects among these independent variables are not considered in the binary logistic regression (which is a deficiency of the approach but, as noted in Appendix 2, can be mitigated by further research on multinomial logistic regression, MANCOVA and PLS-SEM approaches). In effect, the binary logistic regression measures the impact of a single independent variable (say religious status), while controlling for (or isolating) the impact of other independent variables (like income) on the dependent variables – volunteering/giving. However, tests were conducted to assess whether the independent variables are correlated. No significant correlation was found among the independent variables.

These independent variables are outlined below:

- ✦ Sex, coded as male or female.
- ✦ Age in three cohorts 18-35, 35-54, 55 and over.
- ✦ Employment status, including the categories-
 - ✦ Working Full Time – wage (reference category)
 - ✦ Working Part time – wage
 - ✦ Not in the labour force
- ✦ Education status, including the categories
 - ✦ Primary school
 - ✦ Secondary School
 - ✦ Trade certificate
 - ✦ Diploma
 - ✦ Bachelor Degree or higher
- ✦ Weekly gross income, including the categories
 - ✦ Less than \$800
 - ✦ \$800 to \$1,300
 - ✦ Less than \$1,300 to \$1,800
 - ✦ \$1,800 to \$2,800
 - ✦ Over \$2,800
- ✦ Health status associated with barriers to giving time or money in the categories of facing difficulties or no difficulties.
- ✦ Whether the parents of the survey recipient were volunteers.
- ✦ Whether the survey respondent volunteered in childhood.
- ✦ Whether the survey respondent volunteered for a religious group
- ✦ Is your life busy?

The full list of all the independent variables is included in Table 8 below.

Table 8:
Independent variables in the logistic regression

| VARIABLE NAME | DESCRIPTION | INDEPENDENT VARIABLE IN REGRESSION OUTPUT | REFERENCE CATEGORY (WHAT THE INDEPENDENT VARIABLE IS MEASURED AGAINST) |
|-------------------|--|---|--|
| DSEX | Gender at birth | | Male |
| DSEX(1) | Gender at birth | Female | |
| DAGEGP | Age | | 18-34 |
| DAGEGP(1) | Age | 35-54 | |
| DAGEGP(2) | Age | 55 and over (but over 65 added in giving regressions) | |
| DEMPLOY | Employment status | | Working full time or self-employed |
| DEMPLOY(1) | Employment status | Working Part time | |
| DEMPLOY(2) | Employment status | Out of the workforce | |
| DEDLEVEL | Education level | | Primary School |
| DEDLEVEL(1) | Education level | Secondary | |
| DEDLEVEL(2) | Education level | Trade | |
| DEDLEVEL(3) | Education level | Diploma | |
| DEDLEVEL(4) | Education level | Bachelor | |
| DEDLEVEL(5) | Education level | Post-Graduate | |
| DHEALTH | Difficulties with health? | | Yes difficulties |
| DHEALTH(1) | Difficulties with health? | Not aware of difficulties | |
| DHEALTH(2) | Difficulties with health? | Don't know | |
| DINCOME | Income level | | Less than 800 |
| DINCOME(1) | Income level | 800 – 1300 | |
| DINCOME(2) | Income level | 1300 1800 | |
| DINCOME(3) | Income level | 1800 to 2800 | |
| DINCOME(4) | Income level | Over 2800 | |
| DINCOME(5) | Income level | Don't know | |
| GUPARVOL_ORNOT(1) | Growing up did your parents volunteer? | Growing up did your parents volunteer? | Binary |
| GUVOL_ORNOT(1) | Growing up did you volunteer? | Growing up did you volunteer or not? | Binary |

| | | | |
|---------------------|---|---|-----------------------------|
| GUVOLREL_ORNOT(1) | Growing up did you volunteer for religious causes | Growing up did you volunteer for religious causes | Binary |
| BUSY | Is life busy? | 1 (Not busy)-10 (too busy to cope) | Scale |
| Attendance | Religious status based on attendance at least once a year | | N-N |
| Attendance(1) | Traditionally religious | Y-Y | |
| Attendance(2) | Came to faith in adult life | N-Y | |
| Attendance(3) | Moved away faith practice in adult life | Y-N | |
| REL_SPIRIT | Are you religious or spiritual | | Not Religious nor Spiritual |
| REL_SPIRIT(1) | Are you religious or spiritual | Follow a religion and spiritual | |
| REL_SPIRIT(2) | Are you religious or spiritual | Religious (not spiritual) | |
| REL_SPIRIT(3) | Are you religious or spiritual | Spiritual (not religious) | |
| REL_SPIRIT(4) | Are you religious or spiritual | Don't Know / other | |
| Religious component | Scores based on responses to the questions: Religious faith helps shape how I live my life I believe there is a God who is concerned with human beings | Five scales from definitely true to definitely not true and then 'don't know' | Scale |
| Ethical component | Scores based on responses to the questions I try to be as honest as I can I have strong principles which guide how I live Enjoy life and make the most of it | Five scales from definitely true to definitely not true and then 'don't know' | Scale |
| Egoist component | Scores based on responses to Acting on individual rights more important than needs of others I pay as little tax as I legally can | Five scales from definitely true to definitely not true and then 'don't know' | Scale |

SEQUENTIAL REGRESSION

AE has adopted a sequential logistic regression methodology. Previous modelling by DAE adopted a single-step binary logistic regression approach. This means measuring religious behaviour as a treatment effect and controlling for a range of other factors which could explain this behaviour, such as income, age, gender and history of volunteering in the family or in youth, in a single, unified run of the logistic regression model.

AE has deployed the SPSS modelling software package to develop a three-step binary logistic regression. The first step is to measure volunteering or donating (dependent variables) in general without applying the religiosity independent variables. AE then ran a second step to the logistic regression when religiosity measured as attendance was added as an independent variable to the logistic regression. Finally, a third step was added to introduce the wider notion of religiosity in terms of 'belief' and 'belonging' as independent variables as outlined above. This approach focuses the analysis on the question of whether the addition of the religiosity variables increases the explanatory power of the general model about volunteering and giving behaviour.

PREPARING THE DATA FOR ECONOMETRIC ANALYSIS

The CAS survey presents a robust data set with a high degree of integrity. Still, it is inevitably the case that some respondents do not answer every question. Moreover, there are usually some results which stand as outliers. Logistic regression requires a dataset with a limited number of missing values and devoid of more extreme responses to produce reliable results. There is a need to fine tune the dataset for compatibility with the requirements of a standard computerised regression package like SPSS, which is used in this analysis.

Outliers and missing values: dependant variables

In this analysis a response to the CAS survey questions was classified as an outlier and eliminated if after examination of the standard normal distribution of the variable, the response was more than ± 3 standard deviations from the standardised mean. Within the regression itself, outliers were checked each time the regression was run, with the results reported below in Table 9 for each of the dependent variables.

Table 9:
Frequencies, outliers and missing values – dependent variables

| Dependant Variable – logistic regression | No outliers in regression | Coded as 1 | Coded as 0 | Missing |
|--|---|------------|------------|---------|
| Volunteering – not religious | 0 | 3018 | 4175 | 575 |
| Volunteering – religious | 23 identified in the regression and removed | 669 | 6516 | 571 |
| Giving – not religious | 0 | 3054 | 2803 | 1899 |
| Giving – religious | 0 | 1237 | 4355 | 2164 |
| In-kind – not religious | 0 | 2608 | 3078 | 2070 |
| In-kind – religious | 0 | 1257 | 4305 | 2194 |

After outliers were removed, the next data concern related to missing values. Importantly, where data were missing, the incidence of such incomplete responses was found to occur randomly – that is, not correlated with values of the dependant variables. This indicates that the assumptions underpinning the binary regression hold and we can move to the analysis.

As noted above, six dependant variables were created relating to altruistic behaviour: Volunteering (for religious and non-religious organisations); giving (to religious and non-religious organisations); and donating in-kind goods (to religious and non-religious organisations).

Volunteering – not religious

Following the DAE approach, the data set included a range of questions about the cause for which individuals volunteered. A dummy variable was created coded as 1 if someone volunteered for a cause (excepted for religion), and the rest coded 0. Additionally, respondents needed to indicate that they had actually volunteered time. A total of 417 respondents indicated they had not volunteered any time, and so were recoded as 0. This left 3108 who indicated they volunteered, 4073 who did not and 575 were missing.

Volunteering – religious

The same process was followed for volunteering for religious groups, except that individuals who indicated that they volunteered for religious groups were coded as 1, and those who did not were coded as 0. Additionally, those who claimed to have volunteered but indicated that they had not volunteered any time were recoded to 0. This resulted in 669 who had volunteered for religious causes, 6516 who had not, and 571 were missing.

Giving – not religious

The CAS survey asked individuals how often then gave and how much. To form a binary indicator, we followed the same methodology as for volunteering and introduced a dummy variable coded as 1 if the respondent had given anything, and if they had not, this was coded as 0. This resulted in 3054 giving and 2803 who did not give. There was a much higher number of missing variables with 1899 missing.

Giving religious

As with giving non-religious, if someone indicated that they had given to a religious organisation this was coded as a 1, and if they had not, this was coded as a 0. This gave 1237 who donated to a religious organisation, 4355 who did not, with 2164 missing.

In-kind to non-religious charities

As with giving, individuals were asked how often they donated in-kind goods, with those who indicated that they gave at least once coded as a 1, and those who indicated that they did not donate coded as 0. This resulted in 2608 donating to non-religious charities, 3078 not donating, and 2070 missing.

In-kind to religious organisations

As with donating to non-religious charities, individuals who indicated that they had donated in-kind to religious organisations at least once were coded as 1 and those who did not were coded as 0. This resulted in 1257 donating to religious organisations, 4305 not donating, with 2194 missing.

Outliers and missing values: independent variables

There are some challenges with significant missing data for the independent variables in the CAS survey, including the key variable of the measure of religiosity based on religious attendance.

Table 10:
missing values – religiosity based on behaviour/ religious attendance

| | | DAE_Y_N_Category | | | |
|---------|---------------------------|------------------|---------|---------------|--------------------|
| | | FREQUENCY | PERCENT | VALID PERCENT | CUMULATIVE PERCENT |
| Valid | Y- Y _ always attend | 2163 | 27.9 | 35.0 | 35.0 |
| | Y - N Stopped attending | 2052 | 26.5 | 33.2 | 68.2 |
| | N - Y _ Started attending | 315 | 4.1 | 5.1 | 73.3 |
| | N - N _ Never attended | 1649 | 21.3 | 26.7 | 100.0 |
| | Total | 6179 | 79.7 | 100.0 | |
| Missing | System | 1577 | 20.3 | | |
| Total | | 7756 | 100.0 | | |

Scale variables – Busy and Belief

Busy

'Busy' as a scale variable displayed 7,183 valid responses and 527 missing. This issue was resolved by applying a standard normal distribution to the data for this question. When standardised, 4 cases had a standard deviation greater than 3 and were excluded as outliers.

Belief

The other scale variable was the creation of factors from the number of belief variables relating to questions asked in the CAS survey Question 30 with 8 sub-questions. As noted above, the responses were inverse coded so that 6 became "definitely true" and "1 not true" with "don't know" excluded. A number of responses were coded in the data set as 9 so these were recoded as missing.

In order to avoid adding complexity to the model by adding 8 new independent variables, data reduction through Principal Components Analysis was adopted.¹¹ This process identifies the questions with sufficient commonality in responses allowing 'components' or groups of responses to be identified. This resulted in 3 components. One variable was cross-loaded on all three components and so was removed (it could not be allocated to the groups with any reliability).

The three components were:

- Religious – as the questions relate to Belief in God, Religion influencing Life, and Taking what you can from Religion.
- Ethical – this reflects following principles, being honest, enjoying life.
- Egoist – the questions relating to pursuing individual rights and minimising tax.

¹¹ The precise method used was Principle Component Analysis with Varimax rotation and Kaiser normalisation. The component analysis converged on 3 components after 4 iterations.

From an ethics and values perspective these three main perspectives have face validity as well as statistical validity.

A problem emerged with the principal components analysis, in that while it simplified the data for analysis, there were a large number of missing values (3,292, or 42%). Such a large number of missing variables could not be left unaddressed. Consequently, the factor analysis needed further statistical manipulation before it could be applied to logistic regressions. This secondary analysis deployed a method called the Anderson-Rubin method which transformed the data from the original factor analysis into a range with a standard deviation of 1 and a mean of 0. As all of the factors had a mean of 0, missing data was replaced with the mean. This process then means the missing values are dealt with in a way that does not distort the underlying data distributions in the factor analysis.¹² A Missing Values Analysis was conducted. When this was run with the initial set of factors for beliefs, this failed the test to ensure that missing values were distributed at random. When run with the variables with the mean replaced with 0 (remembering that these variables were created so that the mean would be 0), this passed the test that missing values occurred at random ($p=.730$). Additionally, comparison of the '-2 log likelihood' test showed that the revised variables considerably increase the predictive capacity of the overall model.

The high level of missing values in the CAS probably reflects some reticence on the part of the responder in answering quite personal questions about religious attendance and affiliation. In terms of the dependent variable of giving there are high missing values. This is explained by a sense of reticence about declaring levels of financial giving probably due to privacy concerns. In dealing with sensitive issues like religious attendance and financial giving it is understandable that respondents might, to some extent, decline to fully respond and display a higher level of nervousness than might be case in responding to questions of a less personal nature. However, rigorous statistical testing has been undertaken to determine that such missing responses are unlikely to distort the results. More complex statistical techniques like PLS-SEM (see Appendix 2) would provide scope to analyse this in greater detail in further research.

Categorical variables

While we were able to address the issue of missing data in the scale variables, particularly the factor analysis, how this was addressed with the categorical variables was more nuanced. Firstly, where possible the number of categories was reduced. The employment variable ('DEmploy') had a large number of categories with small numbers which create issues in regressions. These were recoded into variables which follow typical economic approaches of working full-time, working part-time, or not in the labour force. This solved the missing data problem.

¹² Another option considered was the Winsorising method of removing the top and bottom 1% of data. In the case of the factors, there was only a standard deviation of 1 due to the method of creating the factors, so Winsorising does not need to occur.

Table 11:
Reclassification of categories in the employment variable

| | | DEmploy | | | |
|---------|--|-----------|---------|---------------|--------------------|
| | | FREQUENCY | PERCENT | VALID PERCENT | CUMULATIVE PERCENT |
| Valid | Working Full time (including self-employed) | 2550 | 32.9 | 33.2 | 33.2 |
| | Working part time | 1142 | 14.7 | 14.9 | 48.1 |
| | Out of the work force | 3985 | 51.4 | 51.9 | 100.0 |
| | Total | 7677 | 99.0 | 100.0 | |
| Missing | System | 79 | 1.0 | | |
| Total | | 7756 | 100.0 | | |

For health and income, there were a couple of cases where 0 was recoded so these were recoded as 'don't know' for both.

For religious/spiritual, a key belief variable, a small number of respondents indicated the response "other" which was combined with "don't know" in order to reduce the change of small numbers in cells.

Cross-tabulations indicated that there were no expected cells with fewer than 5 counts, so the remainder of the categorical variables were left unchanged.

The final issue needing resolution for the categorical variables was the problem of missing data across the data set. Missing Value Analysis was conducted for each of the regressions in order to ensure that the missing variables were missing at random: there was no underlying pattern to the incidence of these missing values. In each case Little's MCAR test did not report a significant amount, indicating that while there are a large number of missing variables, these are likely to be missing at random and therefore unlikely to unduly affect the regression results.

RESULTS OF THE AE LOGISTIC REGRESSION

Five of the six regressions were able to be resolved by the SPSS package. Regression 2, measuring volunteering by religious people to religious causes, did not solve after 20 iterations and has consequently been excluded from the analysis. Overall, the logistic regression shows that adding religious variables to models designed to explain volunteering and giving behaviour *increases* the explanatory power of these models.

Religiosity is seen as driving increased volunteering and giving in the logistic regression analysis. Volunteering is increased by religiosity for both the Y-Y and N-Y cohorts. These results are statistically significant. Similar results are measured in relation to the impact of religiosity on giving, including either financial giving or in-kind giving. Again, these results are statistically significant.

The odds ratios that measure the increased chance of a religious person volunteering and giving are quite high. The particular measure of religiosity that has the greatest impact on volunteering or giving behaviour varies between the different runs of the logistic regressions. However, there is a clear pattern that persons who are in the Y-Y, N-Y or generally 'religious' category, give more time and money than persons who have not engaged with religion and do not hold broadly religious, theological or altruistically ethical perspectives. Table 12 summarises the results of the 6 simulations modelled under logistic regression.

Table 12:
Summary of key results of logistic regressions for religiosity

| | Significant (near zero) | Odds ratio | Significant (near zero) | Odds ratio |
|--|----------------------------|------------|----------------------------|------------|
| Regression model | Y to Y | | N to Y | |
| Volunteering for non-religious causes/organisations | 0 | 1.736 | 0 | 2.218 |
| Financial giving to non-religious causes/organisations | 0 | 1.495 | .011 | 1.487 |
| Financial giving to religious causes/organisations | 0 | 2.315 | 0 | 3.063 |
| In-kind giving to non-religious causes/organisations | 0 | 1.648 | 0 | 1.321 |
| In-kind giving to religious causes/organisations | 0 | 5.288 | 0 | 5.959 |

Volunteering to non-religious causes

The logistic regression analysis shows that persons who identify as being religious, either originally in adult life (the N-Y cohort) or traditionally religious all their lives (Y-Y cohort), have a much higher likelihood of being a volunteer than persons who never identify as being religious. These results are statistically significant. The regression analysis of the cohort who indicated religious engagement in youth but did not engage in religious activity in adult life (the Y-N cohort) did not produce statistically significant results. The analysis controls for a range of independent variables as outlined in Table 8. The results are seen in Tables 13 & 14.

Table 14 shows that adding religiosity to the logistic regression increases the goodness of fit of the model. Through sequential regression, as we add the independent variables of religious attendance and then

the responses to the broader questions of faith in terms of belonging and belief, we have a progressive improvement in the model specification and goodness of fit. This is measured by the high and increasing Chi-square measure as the sequential regression proceeds and the three key statistical tests of -2 Log likelihood, Cox & Snell R Square, Nagelkerke R Square measures provided in SPSS. Step 1 of the model does include the religious variables. Initially, adding religiosity as attendance, increases the explanatory power of the model in Step 2. Adding religiosity in the broader sense of belonging and belief in Step 3 further improves the model fit.

Table 13:
Model 1: Volunteering to non-religious causes- goodness of fit

| OMNIBUS TESTS OF MODEL COEFFICIENTS | | | |
|-------------------------------------|------------|----|------|
| | Chi-square | df | Sig. |
| Step 1 | 585.049 | 21 | .000 |
| Step 2 | 636.181 | 24 | .000 |
| Step 3 | 676.524 | 31 | .000 |

| MODEL SUMMARY | | | |
|---------------|-----------------------|----------------------|---------------------|
| Step | -2 Log likelihood | Cox & Snell R Square | Nagelkerke R Square |
| 2 | 6829.610 ^a | .110 | .148 |
| 3 | 6789.267 ^a | .117 | .156 |

Table 14 presents the logistic regression results for volunteering to non-religious causes. The SPSS model output shows the statistical significance of the Y-Y and N-Y cohorts with the significance test variable being very close to zero. This means that there is a reliable statistical relationship between religious status in adult life and volunteering behaviour at the 1% significance level – an acceptance threshold test for high statistical significance. The Y-N significance test variable is 0.853 showing no reliable measure of statistical significance – we cannot infer statistically any reliable relationship between religious engagement in childhood not continued in adult life and volunteering behaviour.

Table 14:
Results of the logistic regression for Model 1: Volunteering to non-religious causes

| | B | S.E. | WALD | DF | SIG. | EXP(B) |
|------------|-------|------|--------|----|------|--------|
| DSEX(1) | -.046 | .064 | .516 | 1 | .472 | .955 |
| DAGEGP | | | 13.103 | 2 | .001 | |
| DAGEGP(1) | -.200 | .076 | 7.040 | 1 | .008 | .818 |
| DAGEGP(2) | .064 | .081 | .626 | 1 | .429 | 1.067 |
| DEmploy | | | 1.878 | 2 | .391 | |
| DEmploy(1) | .081 | .095 | .729 | 1 | .393 | 1.084 |
| DEmploy(2) | .106 | .078 | 1.829 | 1 | .176 | 1.112 |
| DEDLEVEL | | | 16.163 | 5 | .006 | |

| | | | | | | |
|---------------------|--------|------|---------|---|------|-------|
| DEDLEVEL(1) | .170 | .114 | 2.211 | 1 | .137 | 1.185 |
| DEDLEVEL(2) | .139 | .124 | 1.266 | 1 | .260 | 1.150 |
| DEDLEVEL(3) | .329 | .120 | 7.467 | 1 | .006 | 1.390 |
| DEDLEVEL(4) | .300 | .121 | 6.107 | 1 | .013 | 1.349 |
| DEDLEVEL(5) | .459 | .137 | 11.184 | 1 | .001 | 1.583 |
| Health | | | .997 | 2 | .608 | |
| Health(1) | -.031 | .068 | .202 | 1 | .653 | .970 |
| Health(2) | -.161 | .163 | .968 | 1 | .325 | .852 |
| Income | | | 14.246 | 5 | .014 | |
| Income(1) | -.132 | .084 | 2.432 | 1 | .119 | .877 |
| Income(2) | -.009 | .101 | .007 | 1 | .933 | .992 |
| Income(3) | .002 | .111 | .000 | 1 | .987 | 1.002 |
| Income(4) | .353 | .133 | 6.994 | 1 | .008 | 1.423 |
| Income(5) | -.005 | .096 | .003 | 1 | .957 | .995 |
| GUPARVOL_ORNOT(1) | .694 | .064 | 116.902 | 1 | .000 | 2.001 |
| GUVOL_ORNOT(1) | .424 | .067 | 40.558 | 1 | .000 | 1.528 |
| GUVOLREL_ORNOT(1) | .325 | .077 | 17.669 | 1 | .000 | 1.383 |
| BUSY | .084 | .017 | 24.876 | 1 | .000 | 1.088 |
| Attendance | | | 58.387 | 3 | .000 | |
| Attendance(1) | .552 | .097 | 32.306 | 1 | .000 | 1.736 |
| Attendance(2) | .015 | .080 | .034 | 1 | .853 | 1.015 |
| Attendance(3) | .797 | .149 | 28.625 | 1 | .000 | 2.218 |
| RELSPIRIT | | | 24.926 | 4 | .000 | |
| RELSPIRIT(1) | -.109 | .118 | .854 | 1 | .356 | .896 |
| RELSPIRIT(2) | .140 | .116 | 1.473 | 1 | .225 | 1.151 |
| RELSPIRIT(3) | .309 | .089 | 11.936 | 1 | .001 | 1.362 |
| RELSPIRIT(4) | .168 | .099 | 2.889 | 1 | .089 | 1.183 |
| Religious_component | -.095 | .047 | 4.097 | 1 | .043 | .909 |
| Ethical_component | -.092 | .038 | 5.773 | 1 | .016 | .912 |
| Egoistic_component | .015 | .037 | .164 | 1 | .685 | 1.015 |
| Constant | -1.466 | .148 | 97.558 | 1 | .000 | .231 |

In Table 14 we see that the probability of a person who is in the Y-Y category of religious attendance being a volunteer is 74% higher than the non-religious N-N person (the reference group which always has an odds ratio of 1). In the case of the N-Y group the effect is even more significant with the probability of a person in this cohort being a volunteer to a non-religious cause being 122% higher than the non-religious person (2.2 times more likely). We also see that individuals within the 'spiritual' but not 'religious' group are 36% more likely to be volunteers compared to the reference group - a person who is 'not spiritual or religious' - and this is a statistically significant result.

In terms of the other independent variables, a history of volunteering by the individual or that person's

parents is significant with high odds ratios. There are also two interesting results for education and income variables. There is significance and high odds ratios for only one of the categorical variables in these sets: higher income earners volunteer more and persons with a diploma level qualification volunteer more to non-religious causes.

In short, the econometric modelling reveals a strong altruism response in terms of volunteering from average religious persons relative to average non-religious persons. This is a strong and statistically robust conclusion. Persons who are converted to faith in adult life have greater volunteering engagement relative to those traditionally religious by 36 percentage points or 25%: the average N-Y cohort person is about a quarter more likely to volunteer for a non-religious cause than an average traditionally religious person.

Giving to non-religious causes

Robust results are also evident for logistic regression of giving to non-religious causes. Looking first at financial giving, we see in Table 15 that the addition of religiosity to the giving model increases the goodness of fit. Adding religious attendance (step 2) and measures of belonging and belief (step 3) helps to explain financial giving behaviour. The Chi-square variable is very high and increasing as the sequential regression proceeds to include the religiosity variables.

Table 15:
Model 3: Financial giving to non-religious causes- goodness of fit

| OMNIBUS TESTS OF MODEL COEFFICIENTS | | | |
|-------------------------------------|------------|----|------|
| | Chi-square | df | Sig. |
| Step 1 | 499.175 | 21 | .000 |
| Step 2 | 548.077 | 24 | .000 |
| Step 3 | 612.489 | 31 | .000 |

| MODEL SUMMARY | | | |
|---------------|-----------------------|----------------------|---------------------|
| Step | -2 Log likelihood | Cox & Snell R Square | Nagelkerke R Square |
| 1 | 6301.595 ^a | .096 | .129 |
| 2 | 6252.693 ^a | .105 | .141 |
| 3 | 6188.281 ^a | .117 | .156 |

Table 16:
Results of the logistic regression for Model 3: financial giving to non-religious causes

| | B | S.E. | WALD | DF | SIG. | EXP(B) |
|-------------------|-------|------|--------|----|------|--------|
| DSEX(1) | .164 | .067 | 5.950 | 1 | .015 | 1.178 |
| DAGEGP | | | 44.389 | 2 | .000 | |
| DAGEGP(1) | .233 | .080 | 8.556 | 1 | .003 | 1.262 |
| DAGEGP(2) | .570 | .086 | 44.083 | 1 | .000 | 1.769 |
| DEmploy | | | 5.021 | 2 | .081 | |
| DEmploy(1) | -.075 | .100 | .559 | 1 | .455 | .928 |
| DEmploy(2) | -.182 | .082 | 4.864 | 1 | .027 | .834 |
| DEDLEVEL | | | 22.363 | 5 | .000 | |
| DEDLEVEL(1) | .227 | .116 | 3.837 | 1 | .050 | 1.255 |
| DEDLEVEL(2) | .232 | .126 | 3.380 | 1 | .066 | 1.261 |
| DEDLEVEL(3) | .338 | .123 | 7.552 | 1 | .006 | 1.402 |
| DEDLEVEL(4) | .437 | .124 | 12.358 | 1 | .000 | 1.547 |
| DEDLEVEL(5) | .597 | .144 | 17.264 | 1 | .000 | 1.817 |
| Health | | | 14.805 | 2 | .001 | |
| Health(1) | -.090 | .071 | 1.604 | 1 | .205 | .914 |
| Health(2) | -.705 | .184 | 14.744 | 1 | .000 | .494 |
| Income | | | 62.619 | 5 | .000 | |
| Income(1) | .434 | .087 | 24.988 | 1 | .000 | 1.543 |
| Income(2) | .675 | .106 | 40.787 | 1 | .000 | 1.964 |
| Income(3) | .730 | .117 | 38.832 | 1 | .000 | 2.075 |
| Income(4) | .620 | .141 | 19.240 | 1 | .000 | 1.859 |
| Income(5) | .225 | .101 | 4.951 | 1 | .026 | 1.253 |
| GUPARVOL_ORNOT(1) | .419 | .068 | 38.156 | 1 | .000 | 1.521 |
| GUVOL_ORNOT(1) | .424 | .071 | 36.096 | 1 | .000 | 1.529 |
| GUVOLREL_ORNOT(1) | .063 | .083 | .578 | 1 | .447 | 1.065 |
| BUSY | .061 | .017 | 12.638 | 1 | .000 | 1.063 |
| Attendance | | | 20.850 | 3 | .000 | |
| Attendance(1) | .402 | .102 | 15.540 | 1 | .000 | 1.495 |
| Attendance(2) | .323 | .082 | 15.614 | 1 | .000 | 1.382 |
| Attendance(3) | .397 | .156 | 6.462 | 1 | .011 | 1.487 |
| RELSPIRIT | | | 7.459 | 4 | .114 | |
| RELSPIRIT(1) | .203 | .123 | 2.714 | 1 | .099 | 1.225 |
| RELSPIRIT(2) | .169 | .120 | 2.000 | 1 | .157 | 1.185 |
| RELSPIRIT(3) | .199 | .092 | 4.708 | 1 | .030 | 1.220 |

| | | | | | | |
|---------------------|-------|------|--------|---|------|-------|
| RELSPIRIT(4) | -.012 | .102 | .014 | 1 | .905 | .988 |
| Religious_component | .083 | .049 | 2.860 | 1 | .091 | 1.086 |
| Ethical_component | .138 | .041 | 11.404 | 1 | .001 | 1.148 |
| Egoistic_component | -.234 | .040 | 34.229 | 1 | .000 | .792 |
| Constant | -.891 | .153 | 33.709 | 1 | .000 | .410 |

Table 16 shows that the probability of giving by the Y-Y cohort to non-religious causes is significantly greater than the N-N cohort; the Y-Y cohort have an odds ratio of giving of 1.5 compared to the N-N cohort. So traditionally religious persons are 50% more likely to make a financial donation to a non-religious cause compared to a non-religious person.

Adult converted believers are also twice as likely to donate to non-religious causes as non-religious persons, although here the results have slightly lower but acceptable statistical significance. Persons categorised in the 'ethical' religious category are more likely to give than those who are not spiritual or religious (with high statistical significance). Those who are spiritual but not religious are more likely to give, although the results are only just statistically significant. Interestingly, the 'egoist' cohort are less likely to give with high statistical significance. In terms of the other independent variables, income is significant with high odds ratios, the highest at the middle income level. Higher education levels are also correlated with financial giving with strong statistical significance. Volunteering in childhood by the person or the parent to a non-religious cause is also a strong factor in explaining financial giving to non-religious causes.

The same basic conclusion is predicted in the logistic regression in relation to the impact of religiosity on in-kind giving to non-religious causes for the Y-Y cohort, but there is an interesting result for the N-Y and Y-N cohorts. Table 17 shows increasing goodness of fit as religious variables are added to the model.

Table 17:
Model 5: in-kind giving to non-religious causes- goodness of fit

| OMNIBUS TESTS OF MODEL COEFFICIENTS | | | |
|-------------------------------------|------------|----|------|
| | Chi-square | df | Sig. |
| Step 1 | 488.401 | 21 | .000 |
| Step 2 | 524.959 | 24 | .000 |
| Step 3 | 560.767 | 31 | .000 |

| MODEL SUMMARY | | | |
|---------------|-----------------------|----------------------|---------------------|
| Step | -2 Log likelihood | Cox & Snell R Square | Nagelkerke R Square |
| 1 | 6131.543 ^a | .097 | .129 |
| 2 | 6094.985 ^a | .104 | .139 |
| 3 | 6059.177 ^a | .110 | .147 |

Table 18 shows that the odds ratio for membership of the group who give in-kind donations is 1.65 for the Y-Y cohort and 1.37 for the Y-N cohort. This means that persons who are traditionally religious are two thirds more likely to be in the group that gives in-kind support relative to a person who has never had faith. The N-Y cohort also gives more in-kind support than the N-N group and the results are significant. However, the results for the N-Y cohort lack statistical significance (a measure of 0.079). This is essentially

due to the small sample size for the in-kind donation cohort in the CAS survey. Ultimately, no conclusions in relation to the relationship between in-kind giving to non-religious causes from the N-Y religious cohort are therefore statistically reliable. The 'ethical' cohort gives more in-kind and the egoist group less – both results are statistically significant.

Table 18:
Results of the logistic regression for Model 5: in-kind giving to non-religious causes

| | B | S.E. | WALD | DF | SIG. | EXP(B) |
|---------------------|--------|------|--------|----|------|--------|
| DSEX(1) | .437 | .068 | 41.173 | 1 | .000 | 1.548 |
| DAGEGP | | | 14.599 | 2 | .001 | |
| DAGEGP(1) | .169 | .080 | 4.430 | 1 | .035 | 1.185 |
| DAGEGP(2) | .328 | .086 | 14.570 | 1 | .000 | 1.388 |
| DEmploy | | | 3.405 | 2 | .182 | |
| DEmploy(1) | .157 | .100 | 2.462 | 1 | .117 | 1.170 |
| DEmploy(2) | .135 | .083 | 2.626 | 1 | .105 | 1.144 |
| DEDLEVEL | | | 19.588 | 5 | .001 | |
| DEDLEVEL(1) | -.081 | .118 | .476 | 1 | .490 | .922 |
| DEDLEVEL(2) | -.047 | .129 | .136 | 1 | .713 | .954 |
| DEDLEVEL(3) | .222 | .125 | 3.176 | 1 | .075 | 1.249 |
| DEDLEVEL(4) | .177 | .125 | 1.986 | 1 | .159 | 1.193 |
| DEDLEVEL(5) | .298 | .144 | 4.308 | 1 | .038 | 1.347 |
| Health | | | 33.168 | 2 | .000 | |
| Health(1) | -.100 | .071 | 1.974 | 1 | .160 | .905 |
| Health(2) | -1.196 | .208 | 33.166 | 1 | .000 | .302 |
| Income | | | 47.645 | 5 | .000 | |
| Income(1) | .376 | .088 | 18.301 | 1 | .000 | 1.457 |
| Income(2) | .580 | .107 | 29.562 | 1 | .000 | 1.785 |
| Income(3) | .570 | .117 | 23.690 | 1 | .000 | 1.768 |
| Income(4) | .642 | .141 | 20.605 | 1 | .000 | 1.901 |
| Income(5) | .122 | .104 | 1.385 | 1 | .239 | 1.130 |
| GUPARVOL_ORNOT(1) | .383 | .068 | 31.493 | 1 | .000 | 1.467 |
| GUVOL_ORNOT(1) | .492 | .071 | 48.018 | 1 | .000 | 1.635 |
| GUVOLREL_ORNOT(1) | .092 | .082 | 1.244 | 1 | .265 | 1.096 |
| BUSY | .083 | .018 | 21.956 | 1 | .000 | 1.086 |
| Attendance | | | 25.237 | 3 | .000 | |
| Attendance(1) | .499 | .104 | 23.180 | 1 | .000 | 1.648 |
| Attendance(2) | .315 | .084 | 14.005 | 1 | .000 | 1.370 |
| Attendance(3) | .278 | .158 | 3.085 | 1 | .079 | 1.321 |
| RELSPIRIT | | | 10.260 | 4 | .036 | |
| RELSPIRIT(1) | -.050 | .125 | .157 | 1 | .692 | .952 |
| RELSPIRIT(2) | .038 | .121 | .100 | 1 | .752 | 1.039 |
| RELSPIRIT(3) | .177 | .093 | 3.593 | 1 | .058 | 1.193 |
| RELSPIRIT(4) | -.115 | .105 | 1.182 | 1 | .277 | .892 |
| Religious_component | .028 | .049 | .318 | 1 | .573 | 1.028 |
| Ethical_component | .143 | .042 | 11.635 | 1 | .001 | 1.154 |

| | | | | | | |
|--------------------|--------|------|--------|---|------|------|
| Egoistic_component | -.144 | .039 | 13.291 | 1 | .000 | .866 |
| Constant | -1.465 | .161 | 82.906 | 1 | .000 | .231 |

Giving to religious causes

The logistic regression supports the conclusion that religiosity is statistically linked to giving to religious causes, both in terms of financial giving and in-kind giving. Looking first at financial giving to religious causes we see a very robust model specification. This model is better specified by inclusion of the wider measures of religiosity (the large and increasing Chi-square).

Table 19:
Model 4: financial giving to religious causes - goodness of fit

| OMNIBUS TESTS OF MODEL COEFFICIENTS | | | |
|-------------------------------------|------------|----|------|
| | Chi-square | df | Sig. |
| Step 1 | 809.207 | 21 | .000 |
| Step 2 | 1490.497 | 24 | .000 |
| Step 3 | 1734.525 | 31 | .000 |

| MODEL SUMMARY | | | |
|---------------|-----------------------|----------------------|---------------------|
| Step | -2 Log likelihood | Cox & Snell R Square | Nagelkerke R Square |
| 1 | 4255.284 ^a | .149 | .228 |
| 2 | 4255.284 ^a | .149 | .228 |
| 3 | 4169.137 ^a | .165 | .251 |

The regression for financial giving to religious causes has significance in the Y-Y, N-Y, the measures of belonging in terms of spirituality and religiosity, and belief. In terms of attendance the odds ratios are 2.3 for the Y-Y and 3.1 for N-Y. The Y-N is almost significant as well with a 1.3 odds ratio. Odds ratios of 1.3 to 2.2 are also seen for the wider measures of religiosity. Religious persons of all shapes and colours are very likely to give to religious causes – no surprise here.

Table 20:
Results of the logistic regression for Model 4: financial giving to religious causes

| | B | S.E. | Wald | df | Sig. | Exp(B) |
|-----------------------|--------|------|--------|----|------|--------|
| DSEX(1) | .098 | .085 | 1.308 | 1 | .253 | 1.103 |
| DAGEGP | | | 1.680 | 2 | .432 | |
| DAGEGP(1) | -.048 | .101 | .225 | 1 | .635 | .953 |
| DAGEGP(2) | .087 | .106 | .677 | 1 | .411 | 1.091 |
| DEmploy | | | 1.786 | 2 | .409 | |
| DEmploy(1) | .070 | .125 | .314 | 1 | .575 | 1.073 |
| DEmploy(2) | .139 | .104 | 1.774 | 1 | .183 | 1.149 |
| DEDLEVEL | | | 4.288 | 5 | .509 | |
| DEDLEVEL(1) | -.027 | .154 | .032 | 1 | .859 | .973 |
| DEDLEVEL(2) | -.104 | .169 | .380 | 1 | .537 | .901 |
| DEDLEVEL(3) | .072 | .160 | .204 | 1 | .652 | 1.075 |
| DEDLEVEL(4) | -.112 | .162 | .483 | 1 | .487 | .894 |
| DEDLEVEL(5) | .111 | .179 | .388 | 1 | .533 | 1.118 |
| Health | | | 22.952 | 2 | .000 | |
| Health(1) | -.313 | .087 | 13.011 | 1 | .000 | .731 |
| Health(2) | -1.005 | .258 | 15.179 | 1 | .000 | .366 |
| Income | | | 18.222 | 5 | .003 | |
| Income(1) | .323 | .112 | 8.356 | 1 | .004 | 1.381 |
| Income(2) | .365 | .133 | 7.518 | 1 | .006 | 1.441 |
| Income(3) | .522 | .145 | 12.888 | 1 | .000 | 1.685 |
| Income(4) | .440 | .173 | 6.472 | 1 | .011 | 1.552 |
| Income(5) | .088 | .134 | .431 | 1 | .511 | 1.092 |
| GUPARVOL_ ORNOT(1) | .414 | .088 | 22.329 | 1 | .000 | 1.513 |
| GUVOL_ORNOT(1) | .400 | .090 | 19.522 | 1 | .000 | 1.491 |
| GUVOLREL_ ORNOT(1) | .534 | .092 | 33.936 | 1 | .000 | 1.705 |
| BUSY | .037 | .023 | 2.700 | 1 | .100 | 1.038 |
| Attendance | | | 57.729 | 3 | .000 | |
| Attendance(1) | .839 | .139 | 36.448 | 1 | .000 | 2.315 |
| Attendance(2) | .265 | .133 | 3.992 | 1 | .046 | 1.304 |
| Attendance(3) | 1.119 | .186 | 36.075 | 1 | .000 | 3.063 |
| RELSPIRIT | | | 25.235 | 4 | .000 | |
| RELSPIRIT(1) | .748 | .166 | 20.278 | 1 | .000 | 2.113 |

| | | | | | | |
|---------------------|--------|------|---------|---|------|-------|
| RELSPIRIT(2) | .785 | .163 | 23.228 | 1 | .000 | 2.193 |
| RELSPIRIT(3) | .511 | .145 | 12.382 | 1 | .000 | 1.667 |
| RELSPIRIT(4) | .502 | .160 | 9.891 | 1 | .002 | 1.651 |
| Religious_component | .322 | .066 | 23.633 | 1 | .000 | 1.379 |
| Ethical_component | -.069 | .051 | 1.870 | 1 | .171 | .933 |
| Egoistic_component | -.074 | .046 | 2.549 | 1 | .110 | .929 |
| Constant | -2.831 | .218 | 168.487 | 1 | .000 | .059 |

The last model relates to the relationship between religiosity and in-kind giving to religious causes. The specification of the model in terms of goodness of fit is very high – the best fit of all six regressions (see Table 21). In terms of the odds ratios, (see Table 23) religious attendance shows odds ratios of 5-6 which are significant. In terms of religious belonging – ‘following a religion and being spiritual’ (RELSPIRIT1), ‘religious and not spiritual’ (RELSPIRIT2) – are significant with high odds ratios as is the ‘other’ category (RELSPIRIT4) which will include a mix of theists and atheists. The scalar variable of belief is significant with an odds ratio of 1.6. The egoistic variable is significant but with a highly negative Beta – egoistic persons don’t give in-kind support to religious causes.

In terms of other independent variables, education is not significant but most income categories contribute highly and are significant, the exception being the highest income category. Volunteering in childhood by the person or parents also supports in-kind giving to religious charities.

Table 21:
Model 6: in-kind giving to religious causes- goodness of fit

| OMNIBUS TESTS OF MODEL COEFFICIENTS | | | |
|-------------------------------------|------------|----|------|
| | Chi-square | df | Sig. |
| Step 1 | 550.775 | 21 | .000 |
| Step 2 | 759.563 | 24 | .000 |
| Step 3 | 845.710 | 31 | .000 |

| MODEL SUMMARY | | | |
|---------------|-----------------------|----------------------|---------------------|
| Step | -2 Log likelihood | Cox & Snell R Square | Nagelkerke R Square |
| 1 | 4165.862 ^a | .158 | .242 |
| 2 | 3484.572 ^a | .271 | .416 |
| 3 | 3240.545 ^a | .308 | .472 |

Table 22:
Results of the logistic regression for Model 6: in-kind giving to religious causes

| | B | S.E. | WALD | DF | SIG. | EXP(B) |
|--------------------|-------|------|---------|----|------|--------|
| DSEX(1) | -.402 | .097 | 16.997 | 1 | .000 | .669 |
| DAGEGP | | | .662 | 2 | .718 | |
| DAGEGP(1) | .053 | .115 | .213 | 1 | .644 | 1.055 |
| DAGEGP(2) | .098 | .122 | .654 | 1 | .419 | 1.103 |
| DEmploy | | | 1.458 | 2 | .482 | |
| DEmploy(1) | .074 | .142 | .274 | 1 | .601 | 1.077 |
| DEmploy(2) | .145 | .120 | 1.453 | 1 | .228 | 1.156 |
| DEDLEVEL | | | 2.629 | 5 | .757 | |
| DEDLEVEL(1) | .025 | .179 | .020 | 1 | .888 | 1.026 |
| DEDLEVEL(2) | -.134 | .197 | .462 | 1 | .497 | .875 |
| DEDLEVEL(3) | -.051 | .188 | .074 | 1 | .786 | .950 |
| DEDLEVEL(4) | .012 | .184 | .005 | 1 | .946 | 1.013 |
| DEDLEVEL(5) | .140 | .207 | .459 | 1 | .498 | 1.150 |
| Health | | | 4.805 | 2 | .091 | |
| Health(1) | -.086 | .102 | .723 | 1 | .395 | .917 |
| Health(2) | -.577 | .265 | 4.733 | 1 | .030 | .562 |
| Income | | | 18.188 | 5 | .003 | |
| Income(1) | .430 | .129 | 11.031 | 1 | .001 | 1.537 |
| Income(2) | .413 | .154 | 7.186 | 1 | .007 | 1.512 |
| Income(3) | .547 | .168 | 10.655 | 1 | .001 | 1.728 |
| Income(4) | .592 | .195 | 9.194 | 1 | .002 | 1.807 |
| Income(5) | .163 | .154 | 1.122 | 1 | .289 | 1.177 |
| GUPARVOL_ ORNOT(1) | .310 | .101 | 9.321 | 1 | .002 | 1.363 |
| GUVOL_ ORNOT(1) | .369 | .105 | 12.446 | 1 | .000 | 1.446 |
| GUVOLREL_ ORNOT(1) | .710 | .101 | 49.399 | 1 | .000 | 2.034 |
| BUSY | .005 | .027 | .037 | 1 | .848 | 1.005 |
| Attendance | | | 184.420 | 3 | .000 | |
| Attendance(1) | 1.665 | .178 | 87.152 | 1 | .000 | 5.288 |
| Attendance(2) | .194 | .191 | 1.034 | 1 | .309 | 1.214 |
| Attendance(3) | 1.785 | .220 | 65.628 | 1 | .000 | 5.959 |
| RELSPIRIT | | | 93.057 | 4 | .000 | |
| RELSPIRIT(1) | 1.453 | .202 | 51.621 | 1 | .000 | 4.276 |

| | | | | | | |
|---------------------|--------|------|---------|---|------|-------|
| RELSPIRIT(2) | 1.086 | .200 | 29.398 | 1 | .000 | 2.963 |
| RELSPIRIT(3) | .282 | .200 | 1.987 | 1 | .159 | 1.325 |
| RELSPIRIT(4) | .606 | .210 | 8.291 | 1 | .004 | 1.833 |
| Religious_component | .471 | .079 | 35.659 | 1 | .000 | 1.601 |
| Ethical_component | -.112 | .057 | 3.922 | 1 | .048 | .894 |
| Egoistic_component | -.203 | .052 | 15.405 | 1 | .000 | .816 |
| Constant | -3.082 | .261 | 139.764 | 1 | .000 | .046 |

ECONOMIC GAINS FROM RELIGIOUS BEHAVIOUR BY INDIVIDUALS

A full model of the economic impact of the religious sector would consider the significant role of religious organisations in the Australian economy, particularly in the health and education sectors. Such a model clearly exceeds the scope of this analysis – although this research could inform a wider economic estimate of the impact of religion on economic life in Australia. The focus in this project is simply to measure the economic impacts of religious individuals' giving of time and money. While it is possible to include giving of goods in-kind in the analysis, this would increase the complexity of the measurement significantly, so research on in-kind giving is not included in the final economic estimates.

What drives economic gains from individuals' volunteering behaviour is an estimate of the labour market impacts. Volunteered hours have a notional monetary worth which can be readily calculated. Once the odds ratios from the logistic regressions have been estimated, it is possible to calculate the additional hours of volunteering that occur in aggregate from persons who are religious and to value these additional hours as a measured gain to the economy. Moreover, additional donations from religious persons can be calculated as a gain to the economy. In essence, the task is to calculate the additional hours that flow from people being measured as religious relative to people who are not religious.

The logistic regression measures in all 5 models successfully undertaken show odds ratios for religious behaviour (measured as religious attendance at a regular religious service at least once a year), religious belonging (whether a person is religious and/or spiritual), and religious belief (the group of 3 variables on measures of belief in terms of the religious, ethical or egoistic components derived from the factor analysis). Rather than producing a complex set of economic estimates based on all 3 measures of religiosity, the economic analysis focused only on attendance as behaviour as the key religiosity variable. Further research could expand this estimate to consider the economic impact of religiosity in terms of belonging and belief.

The estimate of economic impacts does not consider the giving of time, money or goods-in-kind to religious causes. Although volunteering to religious causes by religious persons does affect the economy, these gains have been elided from final aggregates, as the focus is on measuring the altruistic element of religious giving. Although volunteering to religious causes by religious persons may be, and is likely to be, genuinely altruistic, the view could be presented that the religious person is simply contributing to their personal community in the same way a member of the football club supports the club. Excluding the giving of time and money from the measured economic impacts of religiosity is an option taken for the sake of conservatism.

AE METHOD OF VALUATING OF ECONOMIC GAINS FROM GIVING TIME/MONEY

The AE and DAE approaches

The approach taken by AE to calculate these additional volunteered hours by religious persons is similar to the approach taken by DAE, but there are some important differences. Both the AE and DAE methods arrive at an increased odds ratio, or probability, that a person who is religious is also a volunteer from the same dataset using binary logistic regression techniques. Both define religiosity in terms of attendance at least once at regular religious services within the last 12 months. Both focus on attendance and do not include frequency of attendance as a measure of religiosity. DAE did not find a statistically significant difference in volunteer hours associated with religious behaviour (using Ordinary Least Squares regression analysis).¹³ AE accepts this conclusion and like DAE applies average hours of volunteering to the various religious cohorts to measure additional hours of volunteering from religious persons. These shared elements of the analysis provide scope to compare the two estimates.

The methods of AE and DAE do diverge in some respects which will have some bearing on the final results. In its version of the logistic regressions, DAE measured the probability that an average person would be a volunteer in the N-Y adult converted cohort relative to the probability of being a volunteer in the N-N non-religious cohort. DAE calculated an uplift factor of approximately 25 percentage points in the probability a person in the N-Y cohort was a volunteer relative to the N-N cohort – the probability of volunteering grew from 38% in the N-N cohort to 63% in the N-Y cohort:

This implies that the treatment effect of being religious is 25 percentage points, and the probability ratio of volunteering for the average person who is religious relative to the average person who has never been religious is 1.7 (63% divided by 38%).¹⁴

DAE then calculated the population in the N-Y cohort by applying the proportion of N-Y persons in relation to religious persons in the CAS survey and applied this to the ABS Census data on religious persons as reported in 2011. This yields the number of persons in the N-Y cohort. The uplift factor is then applied to measure the level of additional religious volunteers, and the economic gains are calculated by measuring the additional hours ascribed to this cohort with the monetary value of these hours calculated at either opportunity cost (45% of a full-time level at average wages) or replacement cost at 100% of a full-time level of work at average wages (see below). In the case of giving money, DAE applied the uplift factor (increased probability of giving money to non-religious causes) of the N-Y cohort relative to the N-N cohort, multiplied this by the average donation and applied this to the N-Y cohort as measured above for volunteering.

AE method for calculating the economic gains from volunteering

The AE method of calculating the economic value of the additional volunteering hours from religious persons (to non-religious causes) and additional non-religious giving differs from the DAE approach. AE has run its binary logistic regression using the SPSS software package as distinct from the R package used by DAE. SPSS does not produce the status effect plots listed on page 45 of the DAE report. AE therefore calculated the extra contribution of religious persons in a different way.

¹³ DAE Report p.15.

¹⁴ DAE Report p.14.

The method AE chose to measure the contribution of religiosity to volunteering to non-religious causes proceeded in the following steps:

1. Calculate the potential population of volunteers as the resident population 18 years or older using the ABS Census of Population and Housing 2016 and ABS Tablebuilder Pro facility. This figure is 18,193,864. The 2021 population in February for persons 18 and over is estimated by grossing up the 2016 census figure by the same factor as the total population grew between September 2016 and February 2021, namely, 5.97%. The Estimated Resident Population 18 or over in February 2021 is therefore 19,280,555.
2. The proportions of the population in the N-N, N-Y and Y-Y cohorts are derived from the AE analysis of the CAS survey.
3. The N-N national cohort size is calculated using the proportion of the N-N population cohort as a percentage of the population measured in the CAS survey.
4. The N-N volunteer population cohort is measured using the proportion of the N-N population who volunteered for non-religious causes in the CAS survey.
5. The Y-Y and N-Y populations were then measured in the same way as the N-N population in step 3-4.
6. A 'notional' baseline for non-religious volunteering was measured. This fictional estimate is a calculation of what the level of volunteering would be if all N-Y and Y-Y persons volunteered at the lower level at which N-N persons volunteer. It is a notional estimate of how things would be if everybody was not religious in terms of volunteering. This is measured by applying the proportion of N-N persons who volunteer to the N-Y and Y-Y cohorts.
7. These 'notional' cohorts were increased by the odds ratios calculated from the logistic regressions for the Y-Y and N-Y cohort relative to the N-N cohort. This produced an estimate of the additional number of volunteers in each religious cohort when religious rather than non-religious behaviour is attributed to the Y-Y and N-Y cohorts using the relevant religiosity factor.
8. The additional volunteering hours of religious persons (Y-Y and N-Y) were derived by multiplying the result of step 7 by the average level of volunteering hours in the CAS survey which is 13 hours per month.
9. The hours were valued at opportunity cost and replacement cost as discussed below. This yielded an annual contribution in economic terms from religious volunteering to non-religious causes.

Calculating the value of additional hours volunteered

Another difference between the AE and the DAE approaches involved the choice of method for calculating the value of additional hours volunteered.

- **Opportunity cost:** This method measures the value that individuals forgo by volunteering; that is, the value of what they may otherwise have been doing with their time if they were not volunteering (45% of the wage rate based on academic research).
- **Replacement cost:** This method measures the cost of replacing a volunteer. That is, if there were no volunteers and the same tasks had to be completed by a paid worker, what would be the wage cost of their time.

DAE calculated both opportunity cost and replacement cost measures but stated “for conservatism, we use the opportunity cost method”.¹⁵ AE believes that the seminal work of the economist Gary Becker, entitled “A Theory of the Allocation of Time”,¹⁶ provides a more theoretically acceptable method of valuing ‘social time’. In that work, Becker valued time allocated at the prevailing wage rate. Following Becker, AE used the replacement cost method for calculation. Still, all estimates are presented in a range from the lower bound of opportunity cost to the higher bound of replacement cost.

THE ECONOMIC VALUE OF VOLUNTEERING BY RELIGIOUS PERSONS TO NON-RELIGIOUS CAUSES

AE estimates that volunteering for non-religious purposes by religious persons leads to substantial annual gains to the Australian economy. The value of volunteering by religious persons, measured in terms of religious attendance, is captured in Table 24 below. The economic gains from religious volunteering to non-religious causes is measured at between \$8,917m (opportunity cost measure) and \$19,817m (replacement cost measure) per annum. 90% of these gains come from the Y-Y cohort of persons who have indicated a faith position throughout their lives.

Table 23:
The economics benefits of volunteering of religious persons to non-religious causes

| ECONOMIC IMPACTS OF VOLUNTEERING BY RELIGIOUS PEOPLE FOR NON-RELIGIOUS CAUSES | N-N | Y-Y | N-Y |
|---|-----------|---------------|--------------|
| Population 18 over Feb 2021 | | 8,290,639 | 578,417 |
| Proportion who volunteer (CAS survey) | 41.12% | | |
| Number of volunteers (CAS survey) | 1,981,840 | | |
| Number of volunteers if N-N volunteering rate applies | | 3,408,765 | 237,821 |
| Predicted Volunteer odds ratio relative to N-N | | 1.736 | 2.218 |
| Predicted additional volunteers from religious status | | 2,508,851 | 289,666 |
| Predicted additional volunteering hours from religious status | | 393,889,580 | 45,477,519 |
| Value of extra volunteering hours- opportunity cost 2021\$m | | 7,994 | 923 |
| Value of extra volunteering hours- replacement cost 2021\$m | | 17,765 | 2,051 |
| DAE Estimate opportunity cost \$m – 2017\$m | | | 339 |
| DAE Estimate replacement cost \$m -2017\$m | | | 918 |

¹⁵ DAE Report p.17.

¹⁶ Becker, G. (1965) A Theory of the Allocation of Time, The Economic Journal, 75(299): 493-517, JSTOR, www.jstor.org/stable/2228949.

ADDITIONAL GIVING TO NON-RELIGIOUS CAUSES FROM RELIGIOUS PERSONS

AE analysis follows the broad approach of the DAE report in valuing the impact of additional donations from religious persons. The level of the donating population is calculated from the CAS survey in relation to categories of religiosity, applying the ABS population estimate as in the case of volunteering.

AE accepts the conclusion of the DAE report¹⁷ that there is no statistical relationship between religiosity and the amount any particular donor gives. Consequently, the calculations of the gains from additional religious donors predicted by the logistic regressions will be valued at the average level of donation in the CAS sample. That is to say, all donors are assumed to donate the same average amount. DAE measured this as \$781 pa. AE applies an indexation factor of 4.9%¹⁸ from the time of the CAS survey/DAE Report measures to arrive at 2021 numbers. Consequently, the average annual donation is \$819.27.

Not all elements of the logistic regression analysis are readily applicable to the economic calculation. As noted above, although wider notions of religiosity are measured in the logistic regressions, there are technical challenges in assessing the non-religious point of comparison from which to assess religiosity in terms of these wider notions of religiosity. Consequently, for the sake of the economic estimates, only religious attendance was adopted as the measure of religiosity to test the extra giving that comes from religious commitment. This follows the DAE approach, while also including the impact of the Y-Y cohort. There are also technical challenges in valuing in-kind goods donated by religious persons relative to non-religious persons. This analysis elides consideration of in-kind giving from the final economic estimates but notes that there is scope to include these elements of the religious donation analysis in further research.

Table 24 shows the additional financial donations from religious persons relative to non-religious persons. The population of the Y-Y cohort is smaller in the giving component of the CAS survey compared to the volunteering component; so the Y-Y population in Table 25 is smaller than the Y-Y population in Table 23.¹⁹

¹⁷ DAE report p.22.

¹⁸ ABS CPI index numbers for Dec 2020 = 118, compared to Sep- 2017 = 112.5. The indexation is 4.9%.

¹⁹ It is worth noting that the additional volunteering done by religious persons is productive and therefore welfare-enhancing. Giving, on the other hand, is essentially just a transfer payment, meaning that religious people choose to allocate more of their income to donations than to other consumption goals. No additional economic output is necessarily incurred as income is simply transferred from one activity (giving) from another (personal consumption). Additional giving, although likely to have social value, is strictly not activity which is not necessarily increasing notional economic output (as distinct from increases in volunteering). Consequently, the value additional giving should not be added to the notional economic gains from increased volunteering. It is noted that this is a divergent approach to the methodology adopted in the DAE report.

Table 24:
The additional giving of religious persons to non-religious causes

| ADDITIONAL FINANCIAL DONATIONS BY RELIGIOUS PEOPLE TO NON-RELIGIOUS CAUSES | N-N | Y-Y | N-Y |
|---|------------|--------------|------------|
| Population 18 over Feb 2021 | 5,161,075 | 6,622,792 | 956,190 |
| Proportion who donate (CAS survey) | 45.00% | | |
| No of givers (applying CAS survey data to national population) | 2,322,484 | | |
| No of donors if N-N donating rate applies | | 2,980,257 | 430,286 |
| Predicted donor odds ratio relative to N-N | | 1.495 | 1.487 |
| Predicted donor numbers from religious status | | 4,455,484 | 639,835 |
| Predicted additional giving from religious donors | | 1,475,227 | 209,549 |
| Value of additional giving from religious status 2021\$m | | 1,209 | 172 |
| DAE Estimate 2017\$m | | | 142 |

CONCLUSIONS

This analysis builds on critical research that SEIROS has undertaken to enhance debate about the positive role that persons of faith make as individuals and in communities to our shared life in Australia. The first analytical report sponsored by SEIROS and written by DAE was based on the proposition that faith in adult life not associated with religious engagement in childhood was the best test of religiosity. The premise that only adult conversion signifies religiosity tends to focus on the individual adult response. However, faith is often nurtured in religious communities since childhood. The elimination of the impact of formation in childhood by faith communities was an arbitrary choice by DAE and significantly reduced the explanatory power of its economic modelling. It effectively reduced religiosity to only 10% of religious people as 90% of people of faith engaged with belief in childhood at the time of the CAS survey.

This new modelling by AE includes the traditionally religious cohort in the analysis of the same dataset as DAE. The report shows that the traditionally religious cohort volunteer much more readily to non-religious causes than persons who never had faith, while noting that the adult converted cohort volunteers most readily. In terms of financial giving, the adult converted cohort and the traditionally religious cohort are equally as likely to give. Similar results are seen from in-kind giving and the giving of time and money to religious causes. The results for the traditionally religious Y-Y cohort and the N-Y cohort are both statistically significant.

One of the key additional features in the AE analysis is the adoption of a wider notion of religiosity. Using the range of questions answered in the CAS survey in relation to spirituality and religion, moral behaviour and religious belief, AE broadened the analysis of religiosity beyond the measure of attendance. There is scope for further research using more complex statistical techniques to unpack some of these complex relationships. Still, defining religiosity in terms of attendance has proven to be an effective mechanism for producing estimates of the economic impact of giving and volunteering behaviour by persons of faith.

That the final economic gains of over \$20bn per year in the AE analysis are much higher than the DAE project is not surprising. The traditionally religious cohort is about 10 times as large as the adult-converted cohort. The key point, however, is that the AE research shows there is a statistically significant association between religious engagement since childhood and the economic benefits that religious people make to the wider social community through volunteering and additional giving from religious persons to non-religious causes. Religious engagement throughout life significantly enhances the Australia, through giving and volunteering, enhancing the economic and social life of all Australians, and serving the common good.

APPENDIX 1: THE ORIGINAL DAE MODELLING

SEIROS commissioned DAE in 2017 to examine the economic impact of religiosity upon donating and volunteering behaviour applying the CAS survey data. What is critical to note here is that SEIROS instructed DAE to measure the giving behaviour of religious persons (of time and money) from non-religious causes thus excluding giving to their church community or other religiously motivated causes. This was possible as the CAS survey asked respondents to separate their volunteering and donations between specifically religious causes and non-religious causes. This was important to measure altruism in religious giving behaviour. While in essence, giving is giving, it could be argued that giving to one's own church community or any religious group may combine a mixed motivation of altruism and loyalty to an individual's local faith community or religious profession. SEIROS considered that eliminating giving to religious causes served the goal of ensuring the analysis would capture giving to the whole community without expectation of some personal return.

The DAE approach to data preparation

DAE took the following approach to data preparation in their report prior to deploying logistic regression.

1. Removing missing values: 2609 and 3330 observations from the volunteering and giving sub-sample, respectively, were removed from the analysis sample due to missing values in variables of interest (e.g. hours volunteered, amount donated, age, gender, income, etc.);
2. Trimming: observations within the top 1% percentile of the volunteering/giving variables were also removed due to high leverage and credibility concerns. This results in 4948 and 4381 of observations, respectively, for the two analyses;
3. Weighting: the samples for both volunteering and giving were separately weighted to match the population distribution of age, gender and state of residence from ABS data. This does not change the number of observations.

Table A.1 from page 28 of the DAE report shows the number of observations in the sample after each step.

Table 25:
DAE Table A.1 Number of observations resulted from each step of data pre-processing

| | VOLUNTEERING SUB-SAMPLE | GIVING SUB-SAMPLE |
|-------------------------|-------------------------|-------------------|
| Original sample | 7756 | 7756 |
| Removing missing values | 5066 | 4426 |
| Trimming | 4948 | 4381 |
| Weighting | 4948 | 4381 |

The removal of missing values and extreme values resulted in a significant reduction in the number of observations in the sub-sample used for the volunteering and giving analysis. Table 26 below taken from the 2017 SEIROS report at page 31 presented there at Table A3 allocates persons to religiosity status in the DAE analysis. The key 'adult converted' cohort is shown in the third data line identified by the category of N-Y.²⁰

²⁰ N-N is the non-religious cohort, N-Y represents those converted in adult life, Y-N measures those religious in childhood but not in adult life, Y-Y measures persons who retain religious commitment through childhood to adult life.

Table 26:
DAE Table A.3, page 31, Final sample size for the four religiosity cohorts.

| | ORIGINAL SAMPLE | VOLUNTEERING SUBSAMPLE | GIVING SUB-SAMPLE | ORIGINAL SAMPLE (EXCLUDING MISSING RELIGIOSITY STATUS) |
|---------|-----------------|------------------------|-------------------|--|
| N -> N | 1494 (19%) | 1233 (25%) | 1081 (25%) | 1494 (24%) |
| Y -> N | 1711 (22%) | 1439 (29%) | 1288 (29%) | 1711 (28%) |
| N -> Y | 181 (2%) | 140 (3%) | 127 (3%) | 181 (3%) |
| Y -> Y | 2766 (36%) | 2136 (43%) | 1885 (43%) | 2766 (45%) |
| missing | 1604 (21%) | 0 (0%) | 0 (0%) | - |
| Total | 7756 (100%) | 4948 (100%) | 4381 (100%) | 6152 (79%) |

DAE chose to apply a weighting of the sample to match the CAS data adjusted as described above with the ABS distribution in the 2012 Census. DAE concluded that these 'results are not sensitive to the change in the applied weightings.'²¹ DAE had the initial task of ensuring the data obtained from the CAS survey was able to be captured in a form that was applicable to complex econometric analysis. DAE approached this task by engaging in data cleansing to remove outlying data events, and they accounted for incomplete responses and applied a weighting process to align the survey data set to match the population distribution of age, gender and state of residence in the ABS Census data. This resulted in a 'clean' data set of 4,948 respondents for the cohort of respondents in the sub-sample who answered the questions on volunteering, and 4,381 respondents who answered questions on donation behaviour.²²

DAE applied this 'cleansed' survey data set to econometric testing using binary logistic regression. This method is often used when seeking to predict probabilities that individuals fall into a binary configuration like membership of mutually exclusive groups 'A' or group 'B' in a population. In this case, the proposition that DAE proposed to test, was whether volunteering is or is not more prevalent amongst religious people. The same question was also posed for donation behaviour. One of the key attractions of the use of logistic regression is that it produces an 'odds ratio'. In the case of the DAE analysis of volunteering and donation behaviour, this odds ratio is the expected chance of any person who is a member of a defined religious cohort also being a volunteer. The logistic regression then measured the relative likelihood of a person being a volunteer, or not being a volunteer, based on religiosity. The same method was also applied to the probability of persons who were religious being donors.²³

²¹ DAE report page 33.

²² As discussed below SEIROS had some concerns with the data cleansing approach taken by DAE which are addressed in the regression analysis in this report.

²³ This approach is a form of univariate regression analysis rather than multivariate methods. This choice adds simplicity to the analysis but it is noted that multivariate regression methods could have been adopted by DAE and are outlined later in this report.

1. DAE tested four propositions in their logistic regression model.²⁴ These propositions were: There is a statistically significant difference between religious and non-religious people, in terms of their likelihood of volunteering for non-religious purposes,
2. There is a statistically significant difference between religious and non-religious volunteers, in terms of the time devoted to volunteering for non-religious purposes,
3. There is a statistically difference between religious and non-religious people, in terms of the likelihood of giving for non-religious purposes,
4. There is a statistical difference between religious and non-religious donors, in terms of the value of their donation for non-religious purposes.

DAE faced the critical question of how religiosity was to be captured in the model. The CAS survey included data on whether the respondent engaged in religious attendance when growing up or in adult life.²⁵ The frequency of attendance was also measured. The modelling approach DAE adopted was to focus on attendance itself rather than frequency of attendance. The stated reason for the option of measuring religiosity in terms of attendance rather than frequency of attendance, was that upon testing, both these variables were highly correlated.

DAE chose to measure the impact of religiosity on volunteering and donation behaviour by considering religiosity as a ‘treatment effect’.²⁶ The incidence of volunteering and donating for religious people is compared to similar activity of the control group of non-religious people. It is also possible to measure this ‘treatment effect’ in a way that restricts the additional giving of time and money by religious people to exclude volunteering and giving to religious communities.

The taxonomy deployed by DAE (and adopted in this report) is explained in Table 1. As discussed above DAE measured religiosity in terms of attendance at a religious event at least once a year measured in childhood and adult life.

In order to isolate the impact of religiosity on volunteering and giving, DAE needed to control for other factors that could be expected to affect volunteering and donating behaviour. DAE included a substantive list of control variables listed including:

1. age range;
2. gender;
3. education level;
4. employment status;
5. income;
6. health status;
7. In the case of volunteering if there is some life history of volunteering (from the person or their parents).
8. Whether life was busy.

²⁴ There are a number of interesting observations to be made from this survey set as categorised. Once DAE purged the series of missing values on the religiosity question we see that over half of all adults (52%) do not indicate attendance at religious events and half of this subset attended religious services when young. Of the other half who answer yes to religious attendance (48% in fact) almost all (94%) attended religious services in childhood. It is interesting that 76% of respondents have over their life indicated some religious engagement – a surprisingly high figure. The cohort that moves into attendance in adult life – the cohort where the ‘treatment effect’ is measured - is just 3% of the population. The sample for the treatment effect is therefore very small at just 181 respondents and just 140 for the ‘volunteering’ sub-sample and 127 for the ‘giving’ sub-sample.

²⁵ Q26 in the CAS survey.

²⁶ MIT Economics at <https://economics.mit.edu/files/32> accessed at 1.30am 28 May 2019.

Some of these factors are highly correlated with volunteering and giving behaviour. Employment, education, higher incomes and a history of volunteering are correlated with volunteering behaviour. For giving behaviour, age, gender, income and health are significant (interestingly and curiously employment is not statistically significant).

The results of the modelling of the treatment effect of religiosity as defined were fairly clear. In the case of volunteering the correlation with religiosity as measured by the 'adult converted' (N-Y) and the 'religious all their lives cohort' (Y-Y) are both statistically significant. Propositions 1 and 3 listed above were affirmed. The DAE logistic regression model estimated that a person who becomes religious in adult life is 1.7 times more likely, on average, to be a volunteer than someone who has never been religious.²⁷

From the logistic regressions (propositions 1 and 2) DAE calculated the increased total hours of volunteering associated with religiosity. How were these to be valued? DAE identified two choices - opportunity cost or replacement cost. The price of the former was measured at 45% of the wage rate less travel costs and the latter was the market cost one would have to pay to employ a person to conduct the same service - the wage rate. These wage rates were multiplied by the mean additional hours of volunteering that a religious person demonstrated relative to the mean hours volunteered for non-religious people. The valuation of the benefit for the opportunity cost method was \$339m pa and \$918m pa for replacement cost. Although DAE favoured the lower rate, the work of leading Chicago economist Gary Becker in his seminal article "A Theory of the Allocation of Time"²⁸ would favour application of the prevailing wage rate to measure the price of time forgone in volunteering. This is essentially the approach recommended in the ABS supporting documentation to the ABS Satellite NPI National Account.²⁹ In light of this research of high standing, the higher estimate of \$918m was preferred by SEIROS.

The DAE model estimated that individuals who transition to being religious are 1.5 times more likely to be donors than those who have never been religious, all else being equal. Expansion of the donation base for religious donors leads to \$142m extra donations per year. So DAE estimated that the positive impact of the treatment of religiosity on giving time or money was from roughly \$0.5b to \$1.15b pa in 2017 dollars. It is not presented by DAE or represented by SEIROS as the complete estimate of the economic effect of religion on Australia life, as it did not consider the role of religious organisations engaged in welfare, health and education. It was essentially a partial estimate of how individuals who are religious make measurable contributions to Australian economic life in the specific areas of giving time and money.³⁰

²⁷ The N-N cohort has a 38% chance of being a volunteer compared to the N-Y cohort of 63% ($63/38=1.7$)

²⁸ Becker, Gary S., 1965. "A Theory of the Allocation of Time." *The Economic Journal*, 75(299) 493-517

²⁹ 5256.0 - **Australian National Accounts: Non-Profit Institutions Satellite Account**, 2012-13, Appendix 6.

³⁰ The statistical results are less compelling when we look at the quanta of hours volunteered or the level of donations given, and DAE propositions 2 and 4 were not affirmed.

THE NEED TO EXTEND THE ORIGINAL DAE MODELLING

Thompson³¹ and Long³² have published criticisms relating to the way religiosity is dealt with by DAE as a 'treatment effect' in their analysis. The research problem debated was when in the life cycle of a person, it was best to test for religiosity. Do we seek to measure religiosity in terms of persons being converted to faith in adult life (as DAE did), or is it also important to focus on the behavioural responses of persons who have been religious all of their lives? Conversion changes behaviour in measurable ways: it is possible to measure the 'before conversion' and 'after conversion' effect. So focusing on the behavioural responses of persons who experience conversion in adult life captures a 'treatment effect' of religiosity in a very clear way - in an easily measurable way. However, the cohort of the 'converted' in adult life is a small part of the total religious cohort and represents only some 3% of the whole population as measured in the CAS survey. The critical methodological question in this research area is how to balance the impact of the 'treatment effect' of religious conversion in adult life against the behavioural impact on volunteering and giving of the cohort who have been religious since childhood? Is it most important to focus on the behavioural response of conversion, or the behavioural response of people who have been religious since childhood without a clear adult conversion event? A focus on the former emphasises the personal, individual response following what is often a live changing event. A focus on the latter emphasises the behavioural impact of long-term engagement and formation in a community of religious persons – a less individualist approach.

It seems reasonable to contend that the behaviour of both cohorts – the adult converted and the religious since childhood - appears to be important to get a complete picture of the impact of religiosity on volunteering and giving. This is a complex problem and creates significant challenges in measuring the overall economic impact of the religious cohort. AE believes that DAE's analysis of the treatment effect of religion is only a partial analysis of the complex problem of behavioural responses of religious persons to giving time and money. The Y-Y cohort – those who remain religious throughout life - make up the vast majority of persons engaged in religious activity. While the approach of DAE to limit the measure to a 'treatment effect' may enhance measurement of causality between volunteering/donating and religiosity, it ignores the contribution of 90% of the total measured religious population constituted by the Y-Y continually religious cohort.³³ The DAE logistic regression model shows that the correlation between sustained religiosity (the Y-Y group) and giving and volunteering is statistically significant. We do not have to restrict the analysis of the impact of religiosity on volunteering and giving to a 'treatment effect' of adult conversion. If we seek to approach the question of the economic impact of religiosity holistically, we should seek to measure the contribution all religious people make to the life of the nation beyond their own communities, and not restrict the analysis to the adult converted cohort. Government has accepted the case to extend the DAE analysis in the decision to fund the SEIROS research proposal.

³¹ Thompson A.K., *The economic impact of religious volunteering and donation*, Religious Liberty in Australia: A New Terra Nullius, Connor Court, Sydney, 2019, pp. 196-13.

³² Long, B., *Measuring the economic impact of religiosity in Australia*, Religious Liberty in Australia: A New Terra Nullius, Connor Court, Sydney, 2019, pp. 214-238, Long B., 'The 'Yeast Test': measuring the economic impact of religiosity in Australia', in *Weaving Theology in Oceania*, B. Green and K. Kanongata'a (eds.), Cambridge Scholars, 2020, pp. 200-218.

³³ These proportions are based on the DAE analysis outlined in Table 1 above.

APPENDIX 2: ALTERNATIVE METHODS TO BINARY LOGISTIC REGRESSION

This appendix outlines in further detail some of the alternative approaches to binary logistic regression to measure the impact of religiosity on volunteering and giving behaviour

Simple linear regression

A linear regression examines how a set of predictor variables items cause an outcome. The key predictor variable is religiosity and the outcome is the behavioural response in terms of volunteering or giving. It is a well-known technique which can include in the analysis the influence of categorical variables such as gender or employment status and scale variables such as income. A linear regression performs well when the data is 'normal', or fits within a bell curve. If the data is heavily skewed then it does not perform well, and the data needs to be manipulated to make it 'fit' the assumptions.

What is involved in a linear regression model is to introduce a scale variable to religious attendance which the CAS dataset allows. In essence we take a simpler model than the DAE logistic regression but allow for religiosity to be measured in terms of degree of attendance – a simpler model but with more detail in terms of that single measure of religiosity.

It is not the preferred approach as AE is not confident that the data is distributed according to the 'normal' bell curve. However, it presents a point of comparison for the DAE logistic regression (with the Y-Y cohort included) and is relatively easy to analyse.

Multiple regression model (MANCOVA)

MANCOVA is a standard multivariate regression model where we measure volunteering, and financial giving, and non-financial giving as variables determined by our measures of religiosity in terms of three measures of religiosity measurable using the CAS survey. These are belief, belonging and behaviour – termed collectively as the '3Bs'.

The MANCOVA model

The hypotheses the model seeks to test are:

- H1 – what is the relationship between multiple measures of religion and volunteering?
- H2 – what is the relationship between multiple measures of religion and financial giving?
- H3 – what is the relationship between multiple measures of religion and in-kind giving?

It is a multivariate regression meaning that the analysis seeks to show how much variation in a group of independent variables affect a dependent variable. The independent variables (what the CAS survey results produce as data) are taken as the measures of belonging, behaviour and belief. The dependent variables (those which we are ultimately measuring) are volunteering and giving.

Volunteering

6 measures of volunteering were available in the data set: volunteering for family and friends, volunteering for nonfamily and friends, volunteering for a charity and volunteering for a religious organisation. Both number and amount (hours) of volunteering per month were available for variables.

Giving

4 measures of giving were in the data set, with frequency and the typical amount donated to both charities and religious organisations.

In-kind

4 measures of in-kind donations were recorded in the data set including frequency and typical amount of in-kind donations to charities and religious organisations.

These measurements are outlined in the table below.

| | |
|-------------------------|------------------------------------|
| Volunteering | Total hours volunteered / month |
| Financial giving | Frequency x amount of gift |
| In-kind giving | Frequency x amount of in-kind gift |

MANCOVA can be undertaken using the Multiple General Linear Model (GLM) regressions in SPSS, to test the dependent variables against the three independent variables.

Partial Least Squares Structural Equation Modelling (PLS-SEM)

MANCOVA and logistic regression are first generation statistical methods to predict relationships between observed things in our world. However, in the last two decades a new brand of statistical models has started to emerge which we can call second generation models that seek to overcome the statistical limitations of the first generation models. A recent addition to the social science researchers' toolkit is Partial Least Squares Structural Equation Modelling labelled as PLS-SEM. It is non-parametric in that it does not require the predictor variables to be distributed 'normally' – an enormous step forward as many variables are not distributed according to the proverbial 'bell curve'.

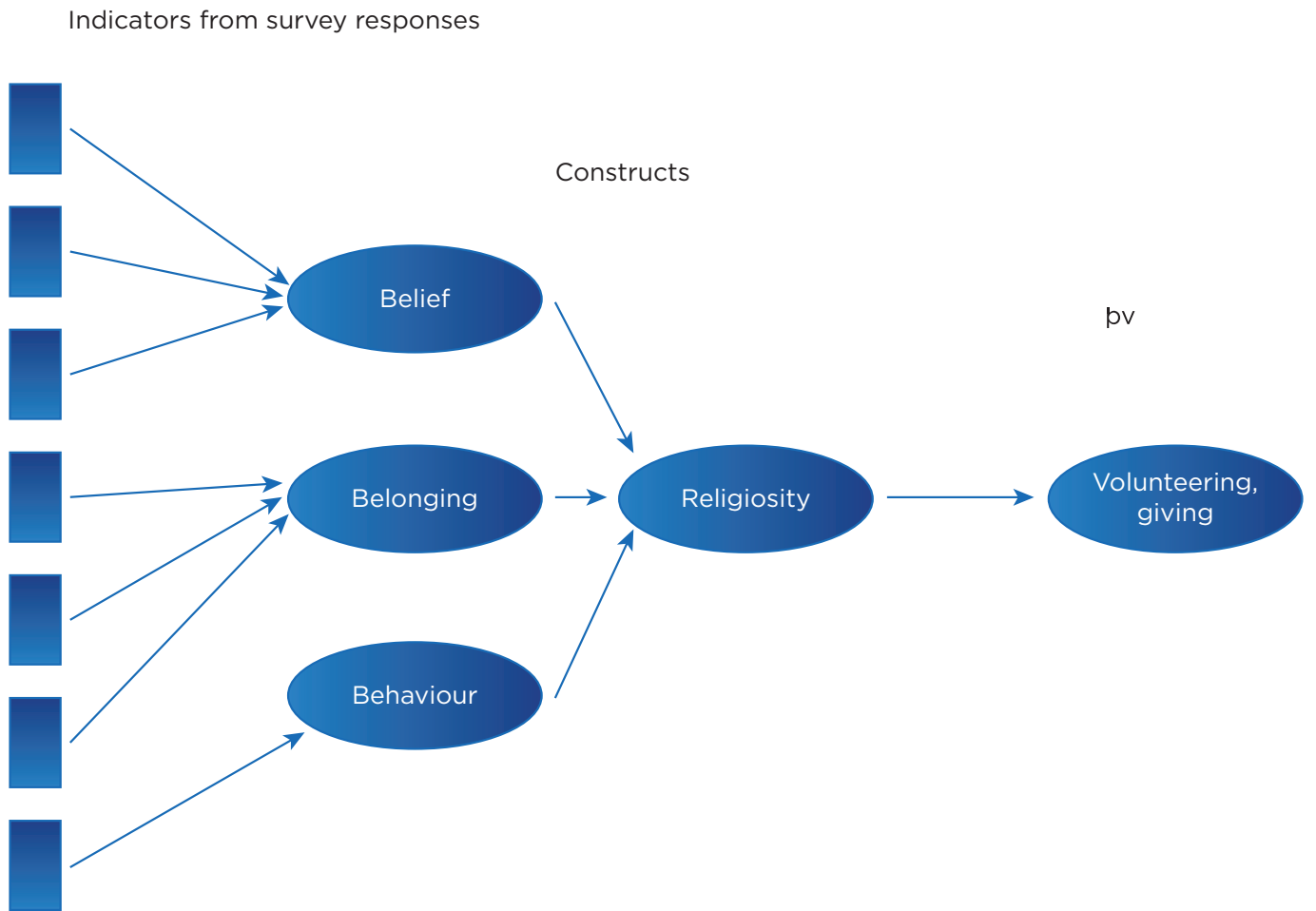
PLS-SEM is a form of analysis which focuses on the principal components of a dependent variable that is to be tested. The model builds a 'structured equation' which is essentially a set of paths (displayed graphically) between indicator variables on the left - constructs or principal drivers of the dependent variable in the middle, and the actual final dependent variable on the right.

The CAS survey data is uploaded as the 'indicator' variables. The relationships between the 'indicators' and the 'constructs' and the ultimate dependent variable construct are also calculated by a series linear of regression techniques built into the specific software tool used.

The results of the model will ultimately be the degree of variation in the dependent variables (volunteering or giving) from different positions in terms of belief, belonging and behaviour. The result would potentially be a cognate model about how religiosity as broadly defined explains volunteering and giving behaviour. From the output of PLS-SEM pathway analysis, researchers can build an economic estimate of the impact of religiosity. This model is the most robust way of examining religiosity and its impact on giving time and money.

A path model could be based on the broad structure in the chart below. While not shown in the path model below, it is also possible to examine how age, education, gender and other independent variables might mediate religion on giving.

Table 27: A potential pathway model for PLS-SEM analysis of religious volunteering and giving



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